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ABSTRACT

These courses of study in ornamental horticulture for secondary and adult technical education levels are based on a 1972 Rutgers University study and are designed to accomodate occupational needs in the field of ornamental horticulture. Job titles emphasized at the secondary level are caretaker, nurserymen, flower grower, and flower salesperson; those for the adult level are nurserymen, forester aide, flower grower, and flower salesperson. "Dictionary of Occupational Titles" descriptions are presented for each of these occupations. General course descriptions with instructional and student behavioral objectives are given for the first and second semesters of the program for the grade levels of 9 through 12, and for the 1-year adult technical program. Information is also provided on course length, entrance requirements, diploma, where offered, and equipment and facilities. A major portion of the document consists of shop practice outlines for the secondary and adult course levels. Outlines for related mathematics, science, and drawing courses are also included. The outlines, set up by job classification, consist of behavioral objective, operations, and related information and show content of courses at the various grade levels. A bibliography of texts and reference books is included with each outline. (NJ)

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Course of Study Outlines
1973 Edition Volume XXX

ORNAMENTAL HORTICULTURE

VT-103-439

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Middlesex County

Vocational and Technical High Schools
and Adult Technical Schools

CE 007 776

MIDDLESEX COUNTY VOCATIONAL AND TECHNICAL HIGH SCHOOLS

and

MIDDLESEX COUNTY ADULT TECHNICAL SCHOOLS

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ORNAMENTAL HORTICULTURE

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Volume XXX

1975 Edition of

COURSE OF STUDY OUTLINES

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The Ornamental Horticulture Advisory Committee appointed by the Board of Education on August 17, 1972 based the establishment of this program upon a 1972 Rutgers University study New Jersey Manpower Needs in Natural Resources and Agriculture. The study indicates that a 28% increase in available positions in the field of Ornamental Horticulture will occur by 1976. The committee set forth guidelines upon which the facility, the course of study, and the program would be developed.

The Board of Education is very grateful to the following members of the Ornamental Horticulture Advisory Committee for their assistance and active interest in our program.

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MIDDLESEX COUNTY VOCATIONAL AND TECHNICAL HIGH SCHOOLS

ORNAMENTAL HORTICULTURE

Job Description

There are so many occupational titles in ornamental horticulture that job descriptions for all related titles cannot be given in this course of study outline. This course of study is developed to accommodate occupational needs in the field of ornamental horticulture as described in the New Jersey Manpower Needs in Natural Resources and/or Agriculture by Drawbaugh and Merritt of Rutgers University. This study conducted in 1972 describes future occupational opportunities in New Jersey, educational training levels deemed necessary, and wages which can be expected for specific jobs. It provides a basis by which a judgement for training a supply of graduates and entry level workers will correlate with the manpower needs of employers in New Jersey and thereby improve the efficiency of matching people with jobs. The study also indicated that ornamental horticulture occupations will increase between 1971 and 1976. Grounds Maintenance, Environmental Technologies, and In-Product Services and Sales will have the highest projected increase of all ornamental horticulture occupations.

D.O.T. Descriptions of Job Titles to be given emphasis in this course of study are:

407.884 Caretaker, Grounds Keeper, Gardener, Yard Laborer - Maintains grounds of industrial, commercial, or public property, performing a combination of the following tasks: cuts lawn, using hand mower or power mower. Trims and edges around walks, flower beds and walls, using clippers and edging tools. Prunes shrubs and trees to shape and improve growth, using shears. Sprays lawn, shrubs, and trees with fertilizer or insecticides. Rakes and burns leaves and cleans or sweeps up litter, using spiked stick or broom. Shovels snow from sidewalks and driveways. Plants grass, flowers, trees, and shrubs. Waters lawn and shrubs during dry periods, using hose or by activating fixed or portable sprinkler system. Repairs fences, gates, walls, and walks, using carpentry and masonry tools. Paints fences and outbuildings. Cleans out drainage ditches and culverts, using shovel and rake. Depending on the size and nature of employing establishment, may operate tractor equipped with attachments, such as mowers, lime or fertilizer spreaders, and lawn roller. May be known according to specific task performed as Grass Cutter, Hedge-and-Shrub Cutter, Lead Raker, Riding-Mower Operator.

406.168 Nurseryman, Nursery Farmer, Propagation Man - Manages nursery to grow trees, shrubs and ornamental flowering plants: Determines kinds and amounts of plants to be grown, using

knowledge of plant germination, soil content, growing habits of plants, and market conditions. Selects and purchases seed, fertilizer, and gardening equipment. Hires and supervises nursery workers to plant seeds and cultivate plants. Supervises activities of workers engaged in marketing nursery products. Provides nursery services, such as landscape planting ornamental plants. May be designated according to specialization of nursery stock as Azalea Grower, Evergreen Grower, or when performing duties in greenhouse, may be designated as Greenhouse Florist.

44.384 Forester Aid - Works alone or as member of crew to inventory, protect, and reforest timber lands performing any combination of the following duties: Observes, measures, and records forest data, such as tree species, volume of merchantable timber, topographical features, and tree seedling mortality. Measures and maps such areas as burns, cutover areas, experimental plots, and timber sales sections, using staff compass and chain. Compiles data from recording or measuring instruments, such as rain gauge, thermometer, stream flow records, and soil moisture gauge. Participates in enforcement of recreation rules and regulations relating to parking, campfires, use of facilities and sanitation, to insure protection of picnic sites, camp grounds, and hunting and fishing areas. Answers questions on regulations, facilities, prevalence and types of wildlife and tree species. Performs seasonal tasks, such as planting trees (Tree Planter), spraying pesticides (Sprayer), pruning and thinning trees to improve timber stands (Tree Pruner), patrolling area to detect and report fires and hazardous conditions (Fire Patrolman), or leading crew to suppress forest fires (Suppression-Crew Leader).

406.181 Flower Grower - Grows shrubs, rootstocks, cut flowers or flowering bulbs: Plans acreages to be planted according to demand for species and variety and availability of seed, bulbs, or scion stock. Operates farm machinery to till soil, distribute fertilizers, and sow, cultivate and harvest crops (Equipment Operator). Buds or grafts scions on seedling stock. Directs work routine of seasonal and permanent farm hands and maintains records of wages and hours for workers. May develop new colors and varieties of flowers by cross-pollination. May be designated according to crop specialty as Bulb Grower, or Rose Grower.

260.458 Salesperson, Flower - Sells natural and artificial flowers, potted plants, floral pieces, and accessories, performing duties as described under Salesperson. Advises customer regarding types of flowers, floral arrangements, and decorations desirable for specific occasions, utilizing knowledge of social and religious customs. Arranges display of flowers and decorative accessories, such as vases and ceramics. Refers to local directories and newspapers to verify information, such as addresses

where flowers are to be delivered and time and place of funerals or other occasions. Contacts florists in other communities by telegraph or telephone to place orders for out-of-town delivery. May design and make up corsages, wreaths, sprays, and other floral decorations.

Course Description

Plants from the beginning have been fundamental to the existence of humanity. Man has varied in the respect and relationship given to plants and their function in the environment. An increase in the horticultural occupation indicates an increase in the importance of plants,and manpower studies indicate a need for trained people to work in the utilization of plant materials. This course of study seeks to give training for vocational applications to the use of plants.

Students seeking to make plants more functional in their lives do so out of a certain frame of reference. The teacher must be able to identify this frame of reference and motivate the student to set new educational objectives for developing even broader concepts as to the meaning of plants. To carry out these concepts, the following teaching objectives are to be considered:

1. The teacher will identify vocational and technical applications related to ornamental horticulture.

2. The teacher will relate vocational and technical applications to the student's frame of reference which include his home, school, and community.

3. The teacher must break down the skills and technologies into learning components and interpret the tasks involved in such a way that the student can comprehend in terms of learning objectives.

9th Grade

First Semester. Students cycle into various shops to identify fields of vocational interest. The cycle program for ornamental horticulture should fall within a cluster of choices related to science, mechanical skills, designing, or business.

Objectives of the Horticultural Cycle Experience:

1. The student will develop an attitude for working safety and productively with the ornamental horticultural facilities, equipment and materials.

2. The student will participate in various activities relating to ornamental horticultural occupations including field trips, films, assigned activities, assemblies, and literature reviews which will help the student in his choice of the horticultural program.

3. The student will gain hands-on experiences in the ornamental horticulture laboratory by working with plants and materials.

Second Semester. Fundamental Practices in Ornamental Horticulture

Objectives:

1. The student will identify plants according to their horticultural classification.

2. The student will perform skills related to directing plant performance. (Progagating, fertilizing, controlling growth, controlling pests, harvesting, transplanting, etc.) These skills will be related to increasing the usefulness of plants.

3. The student will evaluate factors which negatively affect plant performance.

4. The student will become aware of and practice proper work habits for safety.

10th Grade

First Semester. Environmental Technologies of Plant Performance.

1. The student will measure and evaluate environmental aspects of plant growth, harvest, and plant consumption.

Second Semester.

Unit A. Mechanical Skills and Technologies Providing for Plant Performance.

1. The student will gain knowledge of the usefulness of mechanical skills and technologies in providing for plant performance, storage, and consumption.

2. The student will safely perform mechanical skills in carpentry, masonry, welding, glazing, plumbing,motorizing, automating, and crafting to provide for plant performance, storage, and consumption.

Unit B. Merchandising Skills and Technologies.

1. The student will learn merchandising techniques.

2. The student will make sales decisions.

3. The student will perform merchandising functions in simulated situations.

11th Grade

The student will select an area of specialization in which he will concentrate his time and effort. These areas of specialization are:

A. Establishment and Maintenance,
B. Planning, Designing, Interpreting, and Selling,
C. Growing and Harvesting, which includes Greenhouse Operations, Nursery Production and Fruit and Vegetable Production.

Students in each area will plan, in group forums, the components of the course of study for their particular specialization.

A. Establishment and Maintenance Objectives:

1. The student will establish and maintain turf areas which meet the needs of home lawns, golf courses, institutional sites, highway sites, and industrail sites.

2. The student will establish and maintain indoor gardens, conservatories, and special decoratives for use at home sites, places of business, and public facilities.

3. The student will establish and maintain landscapes of home grounds, patios, public grounds and industrial sites.

4. The student will learn about rules, regulations and zoning policies concerning street trees, and installation of same.

B. Planning, Designing, Interpreting, and Selling Objectives:

1. The student will design landscaping for homes, parks, industries, institutions, and public facilities.

2. The student will design flowers and materials for indoor decorating.

3. The student will display horticultural products for the purpose of selling same or for utilizing these horticultural products to promote other commodities or ideas.

4. The student will practice sales and promotion techniques by operating a simulated garden center and flower shop.

C. Growing and Harvesting Objectives:

1. The student will grow sod in a simulated sod production operation.

2. The student will produce landscape plant materials in a simulated landscape nursery.

3. The student will produce cut flowers, pot plants and bedding plants in a simulated greenhouse operation.

4. The student will produce fruits and vegetables in a simulated produce garden.

5. The student will harvest and merchandise horticultural products produced in the horticultural program and sell same in a simulated sales situation.

12th Grade

The student will related to industrial standards for analyzing, problem solving, quality control, and regulating as they relate to the production, storage, and marketing of horticultural products.

1. The student will estimate and calculate costs and relate costs to product or service value.

2. The student will experience leadership in a simulated horticultural services program while assuming the duties of a foreman.

3. The student will experience leadership in a management capacity in a simulated horticultural business.

4. The student will gain 600 hours of on-the-job work experience in a horticultural production business if possibilities allow placement.

5. The student will be able to solve problems in handling supplies, in servicing equipment and in merchandising associated with the ornamental horticultural occupation.

Length of Course

The complete course provides for four years of instruction; a minimum of 180 days per school year, 3 clock hours per day of shop instruction, and 3 clock hours of academic and related instructio

Entrance Requirements

Pupils who enter this course must have successfully completed the eighth grade, have the ability to profit from the instruction and have an interest in the occupation of ornamental horticulture.

Diploma

The student may earn a high school diploma provided he or she has been in the shop program for a minimum of two years and satisfac-

torily meets all of the other requirements for this diploma. Transfer credit will be allowed for appropriate work satisfactorily completed in other high schools

Where Offered

Burr D. Coe Vocational and Technical High School of the Middlesex County Vocational and Technical High Schools
112 Rues Lane, East Brunswick, N. J. 08816

Equipment and Facilities

The Ornamental Horticulture facility of the Middlesex County Vocational and Technical High School system, completed in the winter of 1973-74, contains the most recent innovcations in shop facilities and equipment. The facilities have been constructed and equipped to equal those found in places of business outside of school. Along with this is a greenhouse and out-of-doors areas where students gain valuable hands-on experiences. The facility is flexible, attractive, and free of work hazards.

The facility consists of:

1. Planning room
2. Head house
3. Display and merchandising area
4. Greenhouse
5. Horticulture mechanics shop
6. Lath house
7. Area for vegetable garden plots
8. Area for nursery plantings
9. Aboretum and park trail
10. Ornamental garden areas
11. Turf grass plots
12. Golf green and tee, grass tennis court, and athletic fields

Program of Studies

ORNAMENTAL HORTICULTURE

Time Allotments in 45 Minute Periods Per Week

Subject	Grade Level 9	10	11	12	Total Perio
Shop Practice	20	20	20	20	80
Academic and Related Subjects					
English	5	5	5	5	20
American History			5	5	10
Health and Physical Education	4	4	4	4	16
Career Exploration	1				1
General Math	5				5
Applied Math		4			4
Applied Geometry			3		3
Consumer Math				3	3
Related Biology		4			4
General Science	5				5
Applied Physics			3		3
Related Art and Drawing		3			3
Related Chemistry				3	3
TOTALS	40	40	40	40	160

Course of Study Outline

The following outlines include the shop practice outlines for the high school courses in grades 9 through 12 and for the adult technical one year course. The outlines for mathematics, science, and related drawing are included in this outline.

The shop practice outlines are set up by job classification and describe "Operation" in one column and in a parallel column "Related Information". This implies a dual role of the shop teacher. The teacher is responsible for teaching the skills of Ornamental Horticulture and also for teaching the related information. "Operation" stresses things that are done, and "Related Information" stressed WHY and HOW practices are performed as they are.

The teacher of related subjects is primarily concerned with the principles, fundamentals and basic skills of mathematics, science, or drawing. The teacher uses applications from the shop to motivate, stimulate and facilitate transfer of knowledges, attitudes, and understandings to job application. As the student progresses there will be a shift of emphasis from fundamentals to applications, from the general to the specific, from the simple to the complex.

The overall curriculum pattern of the school, the philosophy, teaching and evaluation methods, curriculum development procedures, requirements for the diploma and supervisory policies are described in detail in Volume I of the complete set of course of study outlines.

The course of study outline is only the shell for a more complete course of study. The outline shows the content covered at the various grade levels and in related programs. The complete course of study also includes all of the various instructional materials used in the process of teaching and learning. These describe the learning experiences which are planned to give the outline substance and meaning. These materials are available as supplements to the outlines and are referred to in the bibliographies given at the end of each outline.

As the student advances in the program, the student will be working with a great deal of independence. For this to be successful, the student must clearly understand his learning objectives and carefully plan the procedure for reaching these objectives. The student should also learn the methods and criteria used for the evaluation of the quality of work that is performed. It is the teacher's role to help the student organize methods and materials to facilitate learning.

COURSE OF STUDY OUTLINE

Ornamental Horticulture

Shop Safety

The following general safety rules apply to all areas of Vocational Education and especially around machinery. They must be observed by students AT ALL TIMES when operating any power equipment.

1. Use goggles at all times when operating a machine.
2. Use COMMON SENSE.
3. Before beginning to operate any machine, the student should clear his mind of all outside activities. Do not allow anything to take your mind or eyes off the work of a running machine.
4. Remove all loose or sloppy clothing before starting to operate any machine. Watches, rings, neckties, long shirt sleeves are very dangerous around running machinery.
5. Where there is danger of getting hair caught and being "scalped", wear a shop net or safety hat.
6. Students must not operate any machine to which he has not been "checked out" by the instructor.
7. Any strange noise or operating cordition should be reported to the instructor immediately.
8. Think out each operation carefully before turning on the power.
9. Defects in materials can cause serious accidents.
10. Before performing any operation on a machine, ALWAYS check with your instructor.
11. When help is needed, ask your instructor or his student assistant.
12. Make and secure all adjustments completely before starting the machine.
13. Do not make adjustments with the guard, or make adjustments you have not been instructed to make.

Shop Safety (cont'd)

14. NEVER operate a machine when the instructor is out of the room.

15. Always keep the operating area around the machine free of tools and other obstructions.

16. All students are to stay away from any machine being operated by another.

General Safety Regulations

1. Always thoroughly clean the machine with a brush - NEVER with fingers. Always turn machine off, when cleaning.

2. HORSEPLAY IS STRICTLY FORBIDDEN, and will be reason for expulsion from the class.

3. REMEMBER - an accident can always cause an impairment for LIFE. DON'T YOU SUFFER FROM AN INJURY.

COURSE OF STUDY OUTLINE

Ornamental Horticulture

Shop Safety

(To be related to and taught within each grade unit)

Objective: The student will develop an attitude for working safely and productively with the ornamental horticultural facilities, equipment, and materials to give the student independent maturity in using the laboratory facilities.

UNIT I DEVELOPING ATTITUDES FOR SAFETY

Operations	Related Trade Information
A. Exploring causes of accidents	1. Lack of awareness of hazard 2. Neglectful attitude 3. Lack of training 4. Equipment in poor condition 5. Non-coordinated action
B. Nature of hazards	1. Lack of tidiness 2. Abuse of electricity 3. Poor preparation 4. Unsafe tools 5. Lack of directions
C. Types of accidents	1. Falls 2. Cuts and punctures 3. Burns 4. Fires 5. Shocks 6. Collisions 7. Poisons
D. Prevention of accidents	1. Safety consciousness 2. Following direction 3. Preparation 4. Awareness 5. Cleanliness and orderliness

UNIT II HOUSEKEEPING PRACTICES

A. Shop organization	1. Floor plan 2. Traffic pattern 3. Clean-up practices 4. Use of storage space 5. Teamwork 6. Emergency plans

UNIT II HOUSEKEEPING PRACTICES (cont'd)

Operations	Related Trade Information
B. Protective measures	1. Clothing and dress 2. Storage of flammables 3. Use of guards on equipment

UNIT III SAFETY PRACTICES AT WORK

A. Personal protective devices	1. Maintaining sharp tools 2. Eye protection 3. Foot protection 4. Methods of lifting 5. Respirators
B. Hand and portable tool safety	1. Use of correct tools 2. Correct use of tools 3. Using electrical hand tools 4. Using hand tools 5. Using motorized tools 6. Using pneumatic tools

UNIT IV SHOP SAFETY PROGRAM

A. Safety organization	1. The safety court system 2. Safety rules and regulations 3. Accident plan 4. Safety evaluation
B. Safety activities	1. Meetings and assemblies 2. Posters and bulletin board 3. Films and visuals 4. Tests and contests 5. Surveys 6. Safety pledge 7. First Aid 8. Student insurance

BIBLIOGRAPHY OF TEXT AND REFERENCE BOOKS

Ornamental Horticulture

Shop Safety

Halsey, Maxwell N. Accident Prevention McGraw-Hill Book Co. Inc., 1961

Williams, William A. Accident Prevention Manual for Shop Teachers American Technical Society, 1964

COURSE OF STUDY OUTLINE

Ornamental Horticulture

Exploratory Class

Objective I. The student will participate in various activities relating to ornamental horticultural occupations via use of field trips, films, assigned activities, speakers, and literature reviews which will assist the student in choosing the vocational horticultural program.

UNIT I FIELD TRIPS

Operations	Related Trade Information
A. Community horticulture tour	1. Parks 2. Businesses 3. Farms
B. Research station tour	1. Rutgers Horticulture Dept.
C. Botanical gardens	1. New York Botanical Gardens

UNIT II FILMS AND FILMSTRIPS

A. Travel films	1. Ornamental gardens 2. National forests and parks
B. Technology films	1. Chemical companies 2. Fertilizer companies 3. USDA films, machinery films
C. Industrial films	1. Food production and marketing 2. Harvesting and packing 3. Commodity films

UNIT III SPEAKERS

A. Professional	1. Managers and operators 2. Consultants and Extension Agents 3. Trades people
B. Promotional	1. Industry public relations 2. Advisory committee 3. Community amateurs

UNIT IV LITERATURE

A. Magazines
   1. Research
   2. Professional
   3. Amateur

B. Books
   1. Career
   2. Special interest
   3. Fiction

UNIT V PARTICIPATIONAL ACTIVITIES

A. Laboratory
   1. Work with upper classmen
   2. Grow plants of interest
   3. Work with tools and equipment

B. Projects
   1. Home
   2. Community
   3. FFA

C. Studies
   1. Community survey
   2. Ecology
   3. Horticultural crop
   4. Student aptitude inventory

Objective II. The student will gain hands on experiences in the laboratory by working with plants and materials to give him a feeling of the ethos of the vocational horticulture fields.

UNIT I PLANT CLASSIFICATION

Operations	Related Trade Information
A. Plant use	1. Food 2. Condiments 3. Floral arts 4. Landscape arts 5. Conservation 6. Recreation 7. Protection
B. Naming plants	1. Naming by association 2. Naming by characteristics
C. Plant grouping	1. Use 2. Species 3. Environment

UNIT II SKILLS WITH PLANTS

A. Propagation	1. Seed 2. Cutting
B. Culture	1. Cultivating 2. Disbudding 3. Transplanting 4. Potting
C. Harvesting	1. Flowers 2. Vegetables
D. Marketing	1. Displaying 2. Preparing orders 3. Taking orders 4. Making a sale
E. Consumption	1. Salads 2. Processed foods 3. Dessert produce 4. Spices 5. Flower arrangements

UNIT III PLANT ENVIRONMENTS

Operations	Related Trade Information
A. Greenhouse	1. Monitoring microclimate 2. Associated plants 3. Associated cultural practices
B. Nursery and garden	1. Monitoring microclimate 2. Associated plants 3. Associated cultural practices
C. Community	1. Home sites 2. Park sites 3. Public sites 4. Industrial sites 5. Business sites

UNIT IV WORKING WITH OTHERS

A. FFA	1. Parliamentary procedure 2. Membership
B. Teams, crews, etc.	1. Leadership 2. Objectivity 3. Crewmanship

Objective III. The student will relate the horticulture classification of plants to man's use.

UNIT I HERBACEOUS PLANT MATERIALS

Operations	Related Trade Information
A. Annual flower gardening	1. Garden plan 2. Varieties 3. Cultural techniques 4. Developing quality 5. Aspects of use
B. Biennial and perennial flowers	1. Garden plan 2. Varieties 3. Cultural techniques 4. Aspects of use
C. Flowering bulb gardening	1. Garden plan 2. Varieties 3. Cultural techniques 4. Aspects of use
D. Pot plant as indoor plants	1. Indoor gardens 2. Varieties 3. Cultural techniques 4. Environment modifications
E. Greenhouse cut flowers	1. Crop planning 2. Varieties 3. Cultural techniques 4. The flower market
F. Common weeds	1. Plant population competition 2. Weed persistence 3. Weed identification 4. Control by cultivation 5. Control by chemicals 6. Control by cultural practices

UNIT II FRUITS AND VEGETABLES

A. Vegetable gardening	1. Garden plan 2. Varieties 3. Cultural techniques 4. Harvesting and grading 5. Produce merchandising 6. Consumption trends 7. Nutritional values

UNIT II FRUITS AND VEGETABLES (cont'd)

Operations	Related Trade Information
B. Fruit farming	1. Orchards and plantings
	2. Varieties
	3. Cultural techniques
	4. Harvesting and grading
	5. Fruit marketing
	6. Consumption trends
	7. Nutritional values

UNIT III LANDSCAPE PLANTS

A. Home sites	1. Framing
	2. Foundation
	3. Specimen
	4. Ground covers
	5. Borders
B. Parks	1. Arboretum type
	2. Shade
	3. Traffic control
	4. Ground covers
	5. Wild life attractors
C. Forests	1. Native trees
	2. Native undercover

Objective IV. The student will evaluate factors which negatively affect plant performance. Students will be able to make judgements of growing factors.

UNIT I ENVIRONMENTAL FACTORS IN COMPETITION WITH PLANT GROWTH

Operations	Related Trade Information
A. Mapping traffic patterns	1. Consumer economics
B. Measuring consumer populations	
C. Measuring disease damage	1. Diagnosing disease problems
D. Measuring insect damage	1. Diagnosing insect problems
E. Plant population competition observation	1. Nature of weed problems
F. Discovering varmints	1. Damages by varmints

UNIT II HUMAN NATURE

Operations	Related Trade Information
A. Discovering negative attitudes toward plants	1. Plants respond to positive attitudes in care practices
B. Charting regularity	
C. Measuring skill quality	1. Plants respond to our work habits
D. Logging costs of accidents	1. Accidents cost money and time

UNIT III POLLUTION AFFECTS

A. Measuring air quality with plants	1. Symptoms of air pollutants 2. Symptoms of air imbalance
B. Measuring water quality through plants	1. Responses of plants to salts 2. Toxins in water 3. Detergents in water
C. Measuring light quality through plants	1. Plant response to excess light 2. Plant response to lack of light

UNIT IV SOIL ADVERSITIES

A. Measuring erosion	1. Causes of erosion
B. Discovering lack of soil aeration	1. Affects of aeration on soil
C. Test soil for moisture movement ability	1. Soil texture 2. Soil slope 3. Soil depth
D. Test for soil nutrient imbalances and soil contaminants	1. Salts in the soil 2. Nematodes and microbes 3. Organic salts

UNIT V MICROCLIMATES

A. Determine frost damage	1. Nature of frost
B. Determine freeze damage	1. Freezing weather
C. Measuring heat stress	1. Affect of excess heat on plants

UNIT V MICROCLIMATES (cont'd)

Operations	Related Trade Information
D. Establish snow tolerance	1. How plants and structures respo to snow weight
E. Establish wind tolerance	1. Loss of moisture by wind 2. Affect and force of wind

Objective V. The student will develop an awareness for safety with respect to work habits and in the performance of necessary horticultural tasks.

UNIT I SANITATION

Operations	Related Trade Information
A. Sterile technique in working with plants	1. Cleanliness pays off
B. Sterile technique in working in the greenhouse	

UNIT II USING TOOLS PROPERLY

A. Association of tools with work capacity	1. Care, use and safety in use of tools
B. Skill with woodworking tools	
C. Skill with masonry tools	
D. Skill with glazing tools	
E. Skill with mechanics tools	
F. Skill with hot metal working tools	
G. Skill with floristory tools	
H. Skill with nursery and garden tools	

UNIT III MEASURING AND MIXING

A. Skill in measuring and mixing agricultural chemicals	1. Handling agriculture chemicals
B. Conservation in material usage	

UNIT IV SCHOOL-COMMUNITY RELATIONSHIPS

Operations	Related Trade Information
A. Classroom projects	1. Things to remember when working with others
B. Working as a team member	2. Self image development
C. Working under supervision	3. Objectivity

UNIT V DEVELOPING PROFESSIONAL HABITS

A. FFA meeting	1. Working through the FFA
B. FFA contests	
C. FFA projects	
D. FFA fund raising	
E. FFA programs for the school	

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Ornamental Horticulture

Shop Practice

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COURSE OF STUDY OUTLINE

Ornamental Horticulture

Shop Practice

Grade 9

Objective I. The student will identify plants according to their horticultural classification. The student will relate growing habits, environments, uses and geneology in learning plants.

Introduction to Ornamental Horticulture

UNIT I GROWING HABITS

Operations	Related Trade Information
A. Classification of stem plants	1. Hardwoods 2. Softwoods 3. Herbaceous 4. Vines 5. Rhizomes 6. Bulbs
B. Classification of leafy plants	1. Monocotyledon 2. Dicotyledon 3. Blades 4. Needles 5. Leaflets 6. Evergreen 7. Deciduous
C. Classification of rooting plants	1. Fleshy roots 2. Tap roots 3. Fiberous roots

UNIT II FUNCTIONAI USES

A. Vegetable identification	1. Varieties 2. Methods of use 3. Production systems 4. Grades
B. Fruit identification	1. Varieties 2. Methods of use 3. Production systems 4. Grades

UNIT II FUNCTIONAL USES (cont'd)

Operations	Related Trade Information
C. Flower identification	1. Varieties 2. Methods of use 3. Production systems 4. Grades
D. Nursery plant identification	1. Varieties 2. Methods of use 3. Production systems 4. Grades
E. Conservation plant identification	1. Varieties 2. Methods of use 3. Production systems 4. Grades
F. Herb plant identification	1. Varieties 2. Methods of use 3. Production systems 4. Grades

Objective II. The student will perform skills related to directing plant performance. These skills will be put to direct use in laboratory exercises to give hands-on experience and opportunity to see plant responses.

UNIT I SOIL AND WATER

Operations	Related Trade Information
A. Take soil samples	1. How soil is formed
B. Testing samples	2. Soil texture
C. Spread soil	3. Soil structure
D. Marking soil plots	4. Soil pH
E. Level soil surfaces	5. Organic matter
F. Spread peat moss	6. Sources of organic matter
G. Double work plant beds	7. Soil mixtures
H. Shred soil	8. Relationship of soil, water, and air
I. Screen soil	9. Plant nutrients
J. Mix soil amendments	10. Fertilizers
K. Fertilize soils	11. Soil tests
L. Sterilize soils	12. Soil drainage
M. Test soil moisture	13. Types of water hoses
N. Check soil salt	14. Soil moisture
O. Drenching soil	15. Plant water needs
P. Watering pot plants	16. Relative humidity levels
Q. Watering outdoor plants	
R. Watering new plantings	
S. Watering flower beds	
T. Watering nursery beds	

UNIT II PROPAGATION

Operations	Related Trade Information
A. Grade seed	1. Seed development
B. Clean seed	2. Clean seed
C. Treat seed	3. Viable seed
D. Transplant seedlings	4. Damping off
E. Labeling	5. Seed storage
F. Taking cuttings	6. Germination process
G. Treating cuttings	7. Planting depth of seed
H. Sticking cuttings	8. Affect of light on seed
I. Budding and grafting	9. Affect of temperature on seed
J. Layering	10. Affect of moisture on seed
	11. Nature of the seed coat
	12. Spores
	13. Selecting cutting stock
	14. Time for making cuttings
	15. Condition of cutting stock
	16. Why cuttings root
	17. Protecting the young plant
	18. Chemicals that help rooting
	19. Bulbs
	20. Roots and stems for cuttings

UNIT III LAWN CARE

A. Water greens	1. Seed bed preparation
B. Handle sod	2. Types of turf grass
C. Sow grass seed	3. Watering and feeding lawns
D. Mow and trim lawns	4. Renovating lawns
E. Care for sand traps	
F. Top dress turf areas	
G. Fertilize lawn areas	

UNIT IV TREE MAINTENANCE

A. Digging trees	1. Choosing a tree to transplant
B. Balling trees	2. Preparing a tree for transplanting
C. Transporting	3. Nature of tree rooting
D. Replanting	4. Mistakes in transplanting
E. Supporting	5. Problems in moving trees
F. Needle feeding	6. Feeding trees
G. Rope handling	7. Using rope
H. Climbing	8. Climbing practices
I. Making pruning cuts	9. Pruning equipment
J. Removing dead wood	10. When to prune
K. Cleaning and painting wounds	11. How to prune trees
L. Removing poisonous plants	12. Safety in tree work
M. Chipping	13. Considerations in bracing
N. Bracing and cabling	14. Sterile technique
O. Cavity repair	15. Cavity problems

UNIT V LANDSCAPING

Operations	Related Trade Information
A. Dig footers and ditches	1. Why landscape
B. Stack stones	2. Garden types
C. Mix concrete	3. Landscape areas
D. Carry concrete	4. Landscape symbols
E. Construct lattice	5. Landscape plans
F. Build fences	6. Landscape structures
G. Construct drainage ways	7. Landscape installation
H. Symbolize plants	
I. Draw plot sketches	
J. Measure plots	
K. Mark off areas	
L. Land clearance	

UNIT VI GARDEN AND GROUNDS MAINTENANCE

A. Sweeping walkways	1. Garden tidiness
B. Cleaning of leaves and litter	2. Composting
C. Laying plastic mulch	3. Mulching with plastic
D. Making labels	4. Using hot beds and cold frames
E. Frepare hot beds	5. Protecting plants from weather
F. Make burlap windbreaks	6. Growth control by pruning
G. Head back pruning	7. Pest control in the greenhouse
H. Thinning out pruning	8. Pest control in the garden
I. Health pruning	9. Cultivation practices
J. Cultivate beds	10. Care in transplanting
K. Weed planted areas	
L. Transplanting shrubs	
M. Transplanting herbs	
N. Pinching for bud set	
O. Pinching for growth control	
P. Filling pots, trays, flats	
Q. Staking and supporting	
R. Thin and space plants	

UNIT VII FLORAL ARRANGING

A. Select flowers and foliage	1. Care of flowers and foliage
B. Spray painting	2. Basic designing
C. Greening arrangements	3. Using color
D. Greening potted plants	4. Flower holders
E. Using frogs and vases	5. Corsage construction
F. Recutting flower stems	6. Making planters
G. Wiring flower stems	
H. Vasing cut flowers	
I. Taping flowers	
J. Picking materials	
K. Tying ribbons	
L. Foiling pots	
M. Tinting flowers	

UNIT VIII GREENHOUSE GROWING

Operations	Related Trade Information
A. Regulating heat	1. The greenhouse environment
B. Regulating humidity	2. Soils for greenhouse work
C. Ventilating	3. Methods of growth control
D. Making potting soils	4. Growing bulbs in the greenhou
E. Potting plants	5. Methods of starting seed
F. Making topiarys	6. Care of the greenhouse
G. Panning bulbs	7. Managing fertilizers
H. Direct seeding	8. Greenhouse pest control
I. Pricking off plants	9. Greenhouse sanitation
J. Staking and supporting	
K. Fertilizing	
L. Glazing sashes	
M. Applying shading compound	
N. Harvesting bloom	
O. Disbudding	
P. Dusting pesticides	
Q. Spraying pesticides	
R. Drenching	
S. Fumigating	
T. Sterilizing	
U. Trapping rodents	

UNIT IX HORTICULTURE AND SHOP CARE

A. Cleaning and sharpening knives	1. Cold metal work
B. Adjusting and sharpening shears	2. Using lubricants
C. Greasing equipment	3. Care of building structures
D. Changing oil of motors	4. Care and safety of motors
E. Lawn mower care	5. Lawn care equipment
F. Repairing tool handles	6. Tool maintenance
G. Sharpening and repairing of hand tools	7. Housekeeping practices for the shop
H. Arranging tools in storage	
I. Cleaning floors	
J. Stocking supply shelves	
K. Packaging supplies	
L. Labeling materials	
M. Sorting supplies	
N. Clearing areas of snow and ice	

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COURSE OF STUDY OUTLINE

Ornamental Horticulture

Shop Practice

Grade 10

Objective I. The student will measure environmental aspects for plant growth, harvest and consumption. The student will manipulate environmental aspects to affect plant growth, harvest, and consumption. The student will evaluate environmental aspects as they relate to plant growth, harvest, and consumption.

UNIT I METHODS OF OBSERVING ENVIRONMENTAL EFFECTS UPON PLANTS

Operations	Related Trade Information
A. Translocation tracing	1. Cell condition
B. Differentiation notation	2. Tissue condition
C. Colormetrics	3. Accelerator growth
D. Leaf analysis	4. Retarded growth
E. Chemical analysis	5. Abnormal growth
F. Growth measurement	6. Stress in plants
G. Transpiration rate	7. Stratification
H. Absorption rates	8. Condition response
I. Metabolism measurements	9. Limiting aspects of plant growth
J. Calibration	
K. Increment bore	
L. Weight change	
M. Population survey	
N. Charting	
O. Reporting	

UNIT II WATER AS A LIMITING FACTOR

Operations	Related Trade Information
A. Test for wilting points	1. Nature of soil water
B. Measure percolation rates	2. Nature of plant tissue water
C. Compare capillary water in the soil	3. Factors affecting water usage by plants
D. Compare tissue water	4. Affects of contaminated water on plants
E. Compare transpiration rates	5. Watering systems
F. Vascular tracing	6. Variation of water needs by plant crops
G. Plumbing for misting	
H. Plumbing for pot watering	

UNIT II WATER AS A LIMITING FACTOR

Operations	Related Trade Information
I. Bed watering	
J. Calibrating mist systems	
K. Checking humidity levels	
L. Increasing humidity	
M. Calculate water needs based on dry matter	

UNIT III SOIL AS A LIMITING FACTOR

A. Collect soil samples	1. Nature of soil
B. Test soil pH	2. Soil nutrients
C. Test for soil nutrients	3. Using soils
D. Separate soil particles	4. UC soil mixes
E. Determine organic content	5. Artificial soils
F. Microbe counting	6. Soil microbiology
G. Ped measurements	7. Organic soils
H. Mixing soils	8. Sterilizing soils
I. Making artificial soils	9. Cultivating practices
J. Checking root penetration	10. Care of plant roots
K. Apply soil amendments	
L. Apply fertilizers	
M. Sterilizing soils by use of chemicals	
N. Sterilizing soils by use of steam and water	
O. Cultivate soil	
P. Ribbon soil for moisture content estimation	
Q. Sterilize soil by heat	
R. Soil basting of roots	

UNIT IV TEMPERATURE AS A LIMITING FACTOR

A. Space heating by steam	1. Optimum temperature levels for plant growth
B. Space heating by water	2. Greenhouse heating systems
C. Soil heating by electrical heating elements	3. Hotbed construction
D. Measuring temperature levels	4. Plant hardiness
E. Estimate heat needs	5. Nature of seasons
F. Maintain heat levels for plant crops	6. Calculating heating needs for greenhouses
G. Set up heat controls	7. Conservation of heat in the greenhouse
H. Manage heat vents	8. Ventilation of the greenhous
I. Set up cooling pads	9. The cooling pad system
J. Care for storage refrigeration	10. Refrigeration for storage
K. Care of produce and flowers in storage	

UNIT V LIGHT AS A LIMITING FACTOR

Operations	Related Trade Information
A. Set up bed shading	1. Affect of light quality on plant growth
B. Time shading of crop	2. Affect of light quantity on plant growth
C. Measure light intensity in foot candles	3. Artificial lighting of plants
D. Install artificial lighting	4. Measuring light
E. Install timing controls for lighting	5. Light needs of plants
F. Grow under red light	6. Lighting in merchandising
G. Grow under violet light	
H. Chart lighting of crops	

UNIT VI MICRO AND MACRO CLIMATES AS LIMITING FACTORS

A. Use of weather clock	1. Study of weather factors
B. Use of wind gauge	2. Microclimates
C. Use of barometer	3. Macroclimates
D. Use of weather forecast	4. Weather fronts
E. Use of weather surveys	5. Affects of wind on plants
F. Develop a micro weather chart	6. Frost and freeze damages
G. Predict weather based upon weather charts	7. Avoiding storm damage
H. Make a weather map with symboling	8. Weather mapping

UNIT VII ORGANIC MATTER AS A LIMITING FACTOR

A. Make leaf mold	1. Organic gardening
B. Make compost	2. Microbes and earthworms
C. Mix organic soil	3. CO_2 use in greenhouses
D. Take soil micro counts	4. Organic mulches
E. Use CO_2 in growing	5. Holding organic levels in soil
F. Manage earthworms	
G. Use bark and chip mulch	
H. Use green manure crops	
I. Use animal manures	

UNIT VIII PESTS THAT ARE LIMITING FACTORS

A. Culture plant diseases	1. Disease identification
B. Culture plant insects	2. Insect identification
C. Identify signs and symptoms of diseases	3. Weed identification
D. Identify insect damage	4. Disease life cycles
E. Identify insects	5. Insect life cycles
F. Make weed identification and count	6. Growing habits of weeds
	7. Controlling diseases
	8. Controlling insects

UNIT VIII PESTS THAT ARE LIMITING FACTORS (cont'd)

Operations	Related Trade Information
G. Calibrate sprayer	9. Controlling weeds
H. Analyze package label	10. Methods of applying pesticide
I. Follow package label directions	11. Safety with pesticides
J. Measure pesticide chemicals	12. Control of pests in storage
K. Mix pesticide chemicals	13. Sanitation in storage
L. Care for sprayers	14. Varmint damage and control
M. Care for dusters	15. Use of systemics
N. Prepare for fumigation by chemical bomb	
O. Apply dusts safely	
P. Apply sprays safely	
Q. Apply gases and smokes safely	
R. Inspection of stored produce	
S. Inspection of stored flowers	
T. Sanitize refrigerators	
U. Sanitize storage containers	
V. Isolate infectious contaminants	
W. Removal of infectious plant parts	
X. Use antibiotic pesticides	
Y. Make systemic injections	
Z. Apply weed controls	
AA. Bait and poison for varmints	

UNIT IX CONTROLLING PLANT GROWTH

A. Health pruning	1. Pruning ornamental trees and shrubs
B. Thinning out	
C. Heading back	2. Pruning fruiting trees
D. Topiary training	3. Pruning vines
E. Bonsai training	4. Use of growth retardants
F. Use of geberilic acid	5. Use of growth simulants
G. Use of cycocel	
H. Use of alrest	
I. Use of B-9	
J. Pruning for fruit placement	
K. Pruning for fruit quality	

UNIT X PROPAGATION METHODS AND TECHNIQUES

A. Stratification	1. Seed propagation
B. Scarification	2. Care and treatment of seed
C. Direct seeding	3. Methods of rooting cuttings
D. Transplant seeding	4. Plant improvement by genetics
E. Hardwood cuttings	5. Plant improvement by selecti
F. Softwood cuttings	

UNIT X PROPAGATION METHODS AND TECHNIQUES

Operations	Related Trade Information
G. Semihardwood cuttings	
H. Leaf cuttings	
I. Budding	
J. Grafting	
K. Layering	
L. Root cutting	
M. Set up a propagation care	
N. Transplant cuttings	
O. Cross pollinate for plant improvement	
P. Select cutting stock	

Objective II. The student will learn the usefulness of mechanical skills and technologies in providing for plant performance, storage, and consumption. The student will safely perform skills in carpentry, masonry, welding, glazing, plumbing, motorizing, automating, and crafting to provide for plant performance, storage, and consumption.

UNIT I GROWING STRUCTURES AND PLANT PROTECTION

Operations	Related Trade Information
A. Construct greenhouse framing	1. Greenhouse construction
B. Cover greenhouse with plastic	2. Greenhouse building materials
C. Operate heating units	3. Greenhouse heating systems
D. Plumbing forced air	4. Greenhouse maintenance
E. Plumbing hot water	
F. Operate ventilating systems	
G. Replace glass in sashes	
H. Glaze sashes	
I. Clean glass	
J. Construct wooden benches	
K. Construct metal benches	
L. Plumb building corners	
M. Squaring corners with carpenter square	
N. Construct flats	
O. Construct hot bed	

UNIT II CONSTRUCTION OF WALKWAYS, PATIOS, DRIVEWAYS, MASONRY STRUCTURES AND WALLS

Operations	Related Trade Information
A. Install drainage provision	1. Skills in masonry
B. Develop grade base	2. Building walkways and patios
C. Lay base	3. Building dry walls
D. Install flagstone patio	4. Masonry construction
E. Install concrete walkway	
F. Build fireplace	
G. Construct dry wall	
H. Construct masonry wall	
I. Construct tie block wall	
J. Mix concrete	
K. Mix mortar	
L. Pour ornamental molds	
M. Reinforce concrete	
N. Cut and set up metal forms	

UNIT III CONSTRUCTION OF LAWN FURNITURE

A. Construct trellis work	1. Wood working
B. Construct planter boxes	2. Using lawn furniture
C. Construct benches and tables	3. Landscape construction of fence boxes, etc.
D. Construct fire places	4. Using park signs
E. Construct animal feeders and boxes	
F. Build fences and partitions	
G. Sign making	

UNIT IV CONSTRUCTION OF TRAILS, PATHWAYS, TREADWAYS, AND VIEWING POINTS

A. Site Clearance	1. Park trails
B. Site survey	2. Site surveying
C. Develop grade	3. Materials for construction of trails
D. Develop grade drainage	
E. Lay trail bedding	
F. Lay trail edging	

UNIT V CRAFTING TO BE USED IN GARDENING AND FLORISTRY WORK

A. Macromay	1. Art of macromay
B. Stone craft	2. Art of using rock
C. Driftwood	3. Driftwood art
D. Candle crafting	4. Art of making candles
E. Frames and foundations	5. Framing with wood, paper and metal
F. Seed craft	6. Art of seedcraft
G. Stage construction	7. Setting up staging for weddings parties, etc.

UNIT VI EQUIPMENT REPAIR

Operations	Related Trade Information
A. Sharpen mower blades	1. Technique of welding
B. Set and adjust blades	2. Cold metal working
C. Setting tire pressure	3. Equipment repair
D. Arc weld	4. Lubrications
E. Acetylene weld and cut	5. Care of tires
F. Metal bending	6. Tempering metal
G. Cold metal working	
H. Replace parts	
I. Repair parts	
J. Oil and grease parts	
K. Temper metal and adjust gears and belts	

UNIT VII SMALL ENGINE REPAIR

A. Adjust spark gaps	1. Selection of gasoline engines
B. Reconstruct recoil starters	2. Repair of 4 cycle engines
C. Replace points and condenser	3. Repair of 2 cycle engines
D. Measure for compression losses	4. Safety with gasoline engines
E. Adjust carburetor	5. Procedure of first maintenance of small engines
F. Repair carburetor	6. Procedure of second maintenance of small engines
G. Clean and grind valves	7. Parts catalogs for related engines
H. Replace piston rings	8. Battery care
I. Torque engine bolts	
J. Repair governors	
K. Straighten shafts	
L. Clean and adjust magneto	
M. Replace gaskets	
N. Change oil	
O. Chart engine use and maintenance	
P. Use parts catalogs	
Q. Fill and clean battery	
R. Time an engine	

UNIT VIII AUTOMATIC CONTROL SYSTEMS

A. Install solenoid	1. Pressure sensitive controls
B. Install and adjust timers	2. Electrical controls
C. Install and maintain thermostats	3. Magnetic controls
D. Maintain on-off switches	4. Mechanical controls
E. Clean and oil control units	5. Adjusting and maintaining automatic controls
F. Use series circuits	6. Electrical circuits
G. Use parallel circuits	7. Safety with electricity
H. Repair switches and outlets	

UNIT IX USING ELECTRICAL MOTORS

Operations	Related Trade Information
A. Read Manufacturers tag	1. Using electrical motors
B. Determine power need	2. Determining motor capacity
C. Load motor to pulley wheels	3. Safety in use of electrical motors
D. Mount motor to job	
E. Use motor safely	
F. Keep motor cleaned and oiled	
G. Replace brushes	
H. Check voltage and amperage	

UNIT X CARE AND REPAIR OF EQUIPMENT AND FACILITIES -PAINTING

A. Paint shelves and cases	1. Knowing paint materials
B. Paint metal	2. Techniques of applying paints
C. Use wood preservative	
D. Spray paint	
E. Stain wood	
F. Paint fences	
G. Apply greenhouse shade paint	

UNIT XI CARE AND REPAIR OF EQUIPMENT AND FACILITIES - PLUMBING

A. Replace gaskets to faucets
B. Plumb with copper tubing
C. Plumb with plastic line
D. Plumb with iron and galvanized pipe
E. Install sprinkler heads
F. Repair water valves
G. Repair water pumps
H. Set up pop-up lawn irrigation with automatic controls

UNIT XII CARE AND REPAIR OF PRUNING EQUIPMENT

A. Make rope ties	1. Care and use of pruning tools and equipment
B. Operate hoist	
C. Care for rope	2. Safety in the use of the chipp
D. Dress leather belts, etc.	3. Care of leather equipment
E. Wear safety dress	4. Rope working for tree work
F. Repair chipper shields	5. Sharpening teeth and blades
G. Sharpen teeth and blades	
H. Grind axes and hooks	
I. Operate auxiliary power	

UNIT XIII CARE AND REPAIR OF SPRAYERS AND SPREADERS

A. Calibrate sprayers	1. Calibrating for application ra
B. Calibrate spreaders	2. Protecting parts from corrosic
C. Clean tanks and parts	3. Care of pumps
D. Replace pump gaskets	4. Types of nozzles and spray gun
E. Repair pressure hose	
F. Clean and repair nozzles	
G. Wear safety equipment	
H. Prepare for storage	
I. Repair and replace parts	

UNIT IX HORTICULTURAL MECHANICS STOCK ROOM

Operations	Related Trade Information
A. Clean parts	1. Using the parts catalog and manual
B. Store parts	2. System of arranging a stock room
C. Inventory parts	3. Safety with oil and gas
D. Store oil and gas	
E. Order parts	
F. Use parts catalog	
G. Use parts manual	

Objective III. The student will learn merchandising techniques. The student will perform merchandising functions. The student will make sales decisions as they relate to selling in florist shops, garden centers, landscape nursery, or produce market.

UNIT I STOCKING AND DISPLAY

Operations	Related Trade Information
A. Stock shelves	1. Determining shelf life of stock
B. Display flowers and other plants	2. Order and appeal in displaying
C. Store flowers and other plants	3. Sanitation in storage
D. Maintain storage area	4. Grading flowers
E. Store received merchandise	5. Making quality sorts
F. Check goods for spoilage and damage	
G. Presort incoming plants and materials	
H. Make quality sort for shipment	
I. Check storage temperature, humidity, etc.	

UNIT II MAKING SALES OF HORTICULTURAL PRODUCTS

A. Using cash register	1. Using the cash register
B. Describe merchandise	2. Using the telephone
C. Identify customer needs	3. Developing salesmanship
D. Answer telephone inquiries	4. The sales demonstration
E. Use affective interpersonal relationships	
F. Demonstrate use of items	
G. Take customer orders	
H. Explain care directions	
I. Solicit sales by phone	

UNIT III ACCURATE, DEFINITIVE RECORDS

Operations	Related Trade Information
A. Write up customer order	1. Record keeping procedures
B. Keep records of receipts	2. Records for florist shops
C. Keep records of expenses	3. Records for nurserys
D. Make out and mail bills	4. Records for garden centers
E. Keep current inventory	
F. Check received merchandise against invoice	
G. Check invoices for math errors	
H. Verify addresses	
I. Perform filing	
J. Perform typing and mailing	
K. Take inventory for tax purposes	
L. Check credit references	
M. Keep employee work record	
N. Make bills to collect accounts due	

UNIT IV ADVERTISING AND PROMOTION

A. Prepare advertising material	1. Methods of advertising
B. Use mail advertising	2. Writing advertising for radio, newspaper and mail
C. Use radio advertising	
D. Use newspaper advertising	3. Art of displaying
E. Display merchandise on shelves	
F. Make window display	
G. Use supplier advertising material	
H. Use hand outs to promote	

UNIT V PROVIDING CUSTOMER SERVICES

A. Wrap and package pot plants	1. Methods of packaging
B. Box and wrap merchandise	2. Speaking effectively
C. Pack and wrap fresh flowers	3. Handling customer complaints
D. Use care hand outs	
E. Interpret plant and flower care	
F. Speak effectively to small groups	
G. Answer customer complaints	

UNIT VI PRICING PRODUCTS

A. Calculate price based upon wholesale costs	1. Methods of pricing merchandise
B. Calculate markup based upon sale price	2. Making a profit
C. Make up price labels	3. Attractive and informative labeling of merchandising

UNIT VI PRICING PRODUCTS (cont'd)

Operations	Related Trade Information
D. Label merchandise	
E. Provide unit pricing	
F. Describe price breakdown	

UNIT VII ROUTING AND DELIVERY OF HORTICULTURAL MERCHANDISE SOLD

Operations	Related Trade Information
A. Write a routing order	1. Shipping procedure
B. Make bus ticket, labels and invoices for shipping	2. Economy in delivery
C. Check packing orders and slips	3. The florist's emergency kit
D. Determins FOB, COD, etc.	4. Making an effective delivery
E. Make quality sort for shipment	
F. Package for shipment	
G. Arrange transportation	
H. Dispatch delivery trucks	
I. Prepare a florist delivery emergency kit	

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Shop Practice

Grade 10

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COURSE OF STUDY OUTLINE

Ornamental Horticulture

Shop Practice

Grade 11

(Based upon student's individualized program)

Landscape Establishment and Maintenance

Objectives:

1. The student will learn the occupational endeavors of people who work in landscape maintenance and establishment vocations.
2. The student will establish and maintain landscapes of home grounds, malls, public grounds, industrial sites, and parks.
3. The student will learn about rules, regulations and zoning policies concerning street trees and installation of same.
4. The student will establish and maintain indoor gardens, conservatories and special decoratives for meeting the needs of home sites, places of business and public facilities.

UNIT I IDENTIFY OCCUPATIONAL OPPORTUNITIES IN LANDSCAPE HORTICULTURE

Operations	Related Trade Information
A. Survey area businesses	1. Landscape nurserymen
B. Interview employers	2. Garden center manager
C. Interview workers	3. Grounds superintendent
D. Write job descriptions	4. Park foreman
E. Develop job profiles	5. Nursery salesman
	6. Garden center salesman
	7. Garden center worker
	8. Landscape worker
	9. Garden curator
	10. Roomscape consultant

UNIT II CULTURAL PRACTICES USED IN LANDSCAPE WORK

Operations	Related Trade Information
A. Pruning practices	
1. Removing dead plants	1. Pruning injured plants
2. Thin out competitive branching and growth	2. Rejuvenation of plants
3. Prune to regulate size	3. Developing plant forms
4. Form plants	4. Maintaining hedges
5. Clip to regulate size	5. Pruning shade trees
6. Remove broken and storm damaged branches	6. Rope work for tree climbing
7. Remove diseased parts	7. Safety in use of chipper
8. Clean tree cavities	8. Selecting scaffold branches
9. Repair bark scars	9. Diseases of trees
10. Treat tree cavities	10. Avoiding trunk damage
11. Lower branches by use of block and tackle	11. Bark tracing
12. Prepare pruning tools for work	12. Methods of injury repair
13. Tap to remove core fluids	13. Branch bracing systems
14. Make an increment bore for health and age analysis	14. Sanitation in tree work
15. Fell trees	15. Care of pruning tools
16. Chunk up cord wood	16. Selection of pruning tools
17. Remove tree stumps	17. Tree working safety
18. Chip tree branches	18. Zoning and regulations
19. Climb trees	19. Evaluation of tree life history
20. Cable and trace weak branching	20. Cord wood for burning, for pulp
21. Use climbing harness	21. Preparing wood chips for mulch
22. Paint tree wounds	22. Preserving leather and rope equipment
23. Root prune lawn trees	23. Surface rooting of ornamental trees
B. Fertilizing practices	
1. Test soil for pH	1. Hunger signs of landscape plants
2. Test soils for nutrient needs	2. Supplying plant nutrients
3. Make leaf analysis	3. Fertilizer ratios, analysis, and formulas
4. Determine fertilize needs based on tree size	4. Organic fertilizers
5. Apply fertilizer within drip line	5. Application rates of fertilizer
6. Prepare application equipment to fertilize subsurface	6. Application equipment
7. Make subsurface fertilizer applications	7. Using kelates
8. Double work fertilizer into flower beds	8. Soil condition for trees and shrubs
9. Make surface broadcast of fertilizers	9. Tree wells and subaeriation
10. Use fertilizer proportioner	

UNIT II CULTURAL PRACTICES USED IN LANDSCAPE WORK (cont'd)

Operations	Related Trade Information
11. Apply foliar feed of trace elements	
12. Apply soil conditioners around trees and shrubs	
13. Make tree wells and sub-aeration provisions	
C. Tilling and Mulching	
1. Till soil in nursery	1. Nutrient balance in use of mulches
2. Use chip and bark mulch	2. Value of mulches
3. Shred compost	3. Types of use of mulches
4. Use licorice and peat	4. Weather protection for less tha hardy plants
5. Use tillers and cultivators	5. Soil requirements for landscape plants
6. Use of compost and leaf mold	
7. Mulch for winter protection	
8. Provide wind protection for broadleaf evergreens	
9. Modify soil texture	
D. Planting landscapes	
1. Ball and burlap nursery stock	1. Balling and burlapping nursery stock
2. Top prune for transplanting	2. Methods for handling nursery stock
3. Root prune for transplanting	3. Reading the landscape plan
4. Bark wrap for transplanting	4. Protection of newly transplants
5. Cable and brace transplanted trees	
6. Dig tree holes	
7. Unload and place trees in dug holes	
8. Fill and water in transplanted trees	
9. Make planting locations according to landscaping plan	
10. Transplant bare-root stock	
11. Plant ground covers and vines	
E. Pest Control	
1. Treat trees systemically by trunk injections	1. Safety in use of pest controls
2. Treat trees systemically by root injections	2. Toxicity of pesticides
	3. Compatibility of pesticides
	4. Methods of spraying and dusting

UNIT II CULTURAL PRACTICES USED IN LANDSCAPE WORK (cont'd)

Operations	Related Trade Information
3. Spray to control insects and diseases	5. Calibration rates for spraying and dusting
4. Survey for pest control damage	6. Affect of spray residue upon the environment
5. Mix sprays	7. Diseases, insects and other pests of ornamental plantings
6. Apply sprays	
7. Apply dusts	
8. Set up traps and barriers	
9. Apply herbicides	
10. Use a weed torch	
11. Check spray residue affects	
12. Keep record of pesticide applications	
13. Make a disease and insect survey	

UNIT III PLANNING PRACTICES USED IN LANDSCAPE WORK

A. Owner landscape plan interview

1. Make a site survey	1. Making the landscape site survey
2. Make a landscape sketch	2. Dimensioning the landscape site and inclusions
3. Make a materials estimate	3. Landscaping the private, public, and service areas of the home site
4. Make a cost estimate	4. Plant materials for private, public, and service areas
5. Draw up a landscape plan	5. Construction of landscape structures
6. Read a landscape blueprint	6. Use of landscape structures
7. Stake off an installation site	7. Park planning
8. Set up site grade stakes	8. Trail planning
9. Set up drainage grade	9. Traffic control in the landscape
10. Set up construction forms	10. Rock gardens
11. Select construction materials	11. Use of water in the landscape
12. Select plant materials for a landscape plan	12. Legal aspects in landscape planning
13. Use furnishings in the landscape plan	13. Zoning laws
14. Use rocks and water in the landscape	14. EPA regulations
15. Check local zoning laws	
16. Plan flower gardens	
17. Lay out ornamental gardens	

UNIT IV LANDSCAPE INSTALLATION AND CONSTRUCTION

A. Construct formal flower beds	1. Laying out the landscape plan
	2. Grading the site
B. Construct informal flower beds	3. Plants for landscape function, framing, foundation, accent specimen, traffic control, shade and beauty

UNIT IV LANDSCAPE INSTALLATION AND CONSTRUCTION (cont'd)

Operations	Related Trade Information
1. Transport and place planter boxes	4. Lawn furnishing
2. Build concrete walkways	5. Landscape fences
3. Build dry walls	6. Walkways and driveways
4. Construct wooden fences	7. Landscape walls
5. Place lawn furniture	8. Landscape site preparation
6. Place benches and tables	9. Minimum maintenance
7. Install lawn watering systems	10. Use of planter boxes
8. Grade site slope	11. Landscape soils
9. Lay dry walls	12. Park construction
10. Lay tie walls	13. Trail construction
11. Use ties for park play facilities	14. Steps, ramps and pathways
12. Select trees and shrubs for replacement	
13. Select plants and shrubs for installation	
14. Modify soils for planting	
15. Level soil for planting	

UNIT V LANDSCAPE FACILITY CARE AND MAINTENANCE

A. Clean parking lots with sweepers	1. Parks are for people
B. Set traffic stops	2. Parks are for wildlife and pe
C. Mark lots, playgrounds and walkways	3. Parks are for natural flora
D. Rope off or set off areas	4. Parks are for exotic plants
E. Set up recreational equipment	5. Parks are for leisure
F. Polish floors	6. Directing public use of publi grounds
G. Dress surfaces asphalt	7. Directing public use of recreational facilities
H. Repair steps	8. Building maintenance
I. Salt for ice control on streets and walkways	9. Swimming pool maintenance
J. Eradicate rodents	10. Maintaining patios, walkways and driveways
K. Plow snow	11. Control of nuisance pests
L. Shovel snow	12. Developing public awareness of maintenance problems
M. Set up decorations	13. Ice and snow removal equipmen
N. Empty trash	14. Ice and snow chemicals
O. Incinerating trash	15. Maintaining picnic areas
P. Repair and reset landscape furniture	16. Care of animal life in the pa
Q. Use effective interpersonal relationships	17. Park abuse and encroachment
R. Patch worn sod	18. Cordwood for burning
S. Protect plantings from dogs and other animals	19. Vending on public premises
T. Set up for meetings	20. Zoning and regulations
U. Check fountains and water stations	

UNIT V LANDSCAPE FACILITY CARE AND MAINTENANCE (cont'd)

Operations

V. Cut fire wood
W. Distribute fire wood to picnic areas
X. Clean and maintain rest rooms and lobbies
Y. Arrange and maintain storage
Z. Sanitize swimming pools
AA. Maintain pumps
BB. Maintain vending areas
CC. Cleaning swimming pools

UNIT VI CURATOR PRACTICES FOR CARE OF INDOOR GARDENS, CONSERVATORIES AND SPECIAL DECORATIVES

A. Determine variety of exotics and other plant materials for planters
B. Draw an indoor garden plan
1. Evaluate indoor environment for plant survival
2. Train topiary plants
3. Bonsai train plants
4. Water indoor plants
5. Fertilize indoor plants
6. Treat indoor plants for diseases and insects
7. Report container plants
8. Replace and rearrange plants in a planter
9. Clean and shine foliage plants
10. Pinch stray plant growth
11. Protect plants from abusive traffic
12. Install automatic water systems
13. Keep areas clean and neat
14. Remove dead or inferior plants
15. Care for over winter of container plants
16. Provide plants in season
C. Use Affective interpersonal relationships
D. Answer inquiries concerning plants
E. Order replacement plants
F. Order supplies and materials

Related Trade Information

1. Construction and use of planter boxes
2. Growing plants indoors
3. Selection of indoor plants
4. The epiphytes
5. The aerophytes
6. Succulents
7. Formality for indoor gardens
8. Informality for indoor gardens
9. Hanging basket gardening
10. Developing the indoor garden schematic
11. Housekeeping practices in indoor garden care
12. Topiary plants
13. Meeting the public
14. Decorating with plants
15. Maintenance records
16. Traffic control and plant protection
17. Storing and overwintering plant materials
18. Renovating planter boxes

UNIT VI CURATOR PRACTICES FOR CARE OF INDOOR GARDENS, CONSERVATORIES AND SPECIAL DECORATIVES (cont'd)

Operations	Related Trade Information
G. Maintain plant form	
H. Keep records of applications of fertilizers and pesticides	
I. Identify pests	
J. Exercise professional language	
K. Decorate with plants	
L. Repair flower boxes and containers	
M. Construct plant containers of wood	
N. Construct plant containers of cement	
O. Prepare hanging baskets	
P. Train cascading plant forms	

Turf Grass Establishment and Maintenance

(Based upon student's individualized program)

Objectives:

1. The student will establish and maintain turf areas meeting the needs of home lawns, golf courses, institutional sites, highway sites, and industrial sites.

2. The student will grow sod in a simulated sod production operation.

UNIT I EXPLORING JOB OPPORTUNITIES IN TURFGRASS BUSINESSES

Operations	Related Trade Information
A. Survey area businesses	1. Turf specialist
B. Interview employers	2. Agronomist
C. Interview workers	3. Golf course superintendent
D. Write job descriptions	4. Athletic field superintendent
E. Develop profiles	5. Landscape contractor
	6. Assistant golf course superintendent
	7. Greensworker
	8. Turf supplies salesman
	9. Landscape gardener
	10. Groundskeeper
	11. Athletic field groundskeeper
	12. Laborer

UNIT II KINDS OF TURFGRASSES AND THEIR USE

Operations	Related Trade Theory
A. Identify grasses	1. Vegetative characteristics of turfgrasses
B. Determine seed application	2. Parts of a grass plant
C. Determine variety to plant	3. Tips of leaf blades
D. Make up seed order	4. Kentucky bluegrass
E. Check seed quality	5. Merion Kentucky bluegrass
F. Determine culture by variety	6. Rough bluegrass
G. Identify grass seed	7. Annual bluegrass
H. Read seed package	8. Tall fescue
I. Mix seed	9. Creeping red fescue
	10. Chewing fescue
	11. Colonial bentgrasses
	12. Creeping bentgrass
	13. Redtop
	14. Ryegrasses
	15. Crownvetch

UNIT III MAINTAINING RESIDENTIAL AND INSTITUTIONAL LAWNS

A. Apply organic and inorganic fertilizers	1. Maintaining soil fertility
B. Clip turf to desired height	2. Mowing the lawn
C. Strip dead and diseased areas	3. Watering lawns
D. Water by hand and by automatic systems	4. Controlling lawn pests
E. Determine sprinkler locations	5. Turfgrass weeds
F. Install water systems	6. Turfgrass diseases
G. Determine pesticide needs	7. Turfgrass insects and controls
H. Apply pesticides	8. Using pesticides
I. Identify weeds, insects, and diseases	
J. Calibrate applicators	
K. Top dress a lawn	
L. Trim and manicure lawn areas	

UNIT IV MAINTAINING ATHLETIC FIELDS AND SPECIAL TURF AREAS

A. Replace sod	1. Athletic field maintenance
B. Aerate compacted areas	2. Special turf maintenance
C. Drain water pockets	
D. Mark field lines	
E. Detect turf problems	

UNIT V MAINTAINING GOLF COURSES

A. Change tee markers, benches and trash baskets	1. Maintaining greens, tees, and fairways
B. Strip dead and diseased areas	2. Fertility
C. Operate thatchers, mowers and aerators	3. Mowing
D. Move greens cups	4. Aeration
E. Control diseases and insects	5. Thatch
F. Control weeds	6. Watering
G. Irrigate and water	7. Pest control
H. Maintain cart trails	8. Weat distribution
I. Maintain sand traps	

UNIT VI PLANNING AND ESTABLISHING NEW TURFGRASS AREAS

Operations	Related Trade Information
A. Develop installation specifications	1. Planning new turfgrass areas
B. Draw up plans for irrigation	2. Planning the grade, drainage, and irrigation
C. Write out fertilizer and conditioner recommendations	3. Selecting and applying fertilizers
D. Determine application settings for equipment	4. Using physical conditioners in soils
E. Determine cost and time for area work	5. Preparation for seeding
F. Plot and stake a turf installation	6. Selecting kinds of grasses and grass mixtures
	7. Seeding
	8. Vegetative planting
	9. Caring for new grass
	10. Renovating old turf areas

UNIT VII GROWING SOD FOR COMMERCIAL SALE

A. Selecting sites for growing commercial sod	1. Site selection and preparation
B. Selecting seed and fertilizers	2. Seeding and growing sod
C. Sowing and starting new grass for sod	3. Cutting, lifting, and rolling sod
D. Watering and irrigation	4. Handling and transporting sod
E. Clipping	5. Rolling out sod
F. Feeding	6. Caring for new sod
G. Thatching and aerating	7. Quality control
H. Weed, insect and disease control	
I. Cutting, lifting and rolling sod	
J. Handling and transporting and labeling sod	
K. Rolling out sod	
L. Care for the new sod	
M. Keep records of sod care	
N. Keep inventory and sales records	
O. Grade sod	
P. Store and handle seed, chemicals and supplies	

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Shop Practice

(Landscape Establishment and Maintenance)

Grade 11

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h. Garden Pools, Fountains, and Waterfalls.
i. Gardening in Containers.
j. How to Build Patio Roofs.
k. How to Improve Your Home by Landscaping.
l. Ideas for Entries and Front Gardens.
m. Ideas for Landscaping Your Home.
n. Landscaping for Modern Living.
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COURSE OF STUDY OUTLINE

Ornamental Horticulture

Shop Practice

Grade 11

(Based upon student's individualized program)

Designing, Interpreting and Selling

Objectives:

1. The student will design flowers and materials for decorating indoors.
2. The student will display horticultural products for the purpose of selling same.
3. The student will practice sales and promotion techniques by operating a simulated garden center and flower shop.
4. The student will design landscaping for homes, parks, industries, institutions and public facilities.

UNIT I EXPLORING OCCUPATIONAL OPPORTUNITIES IN HORTICULTURAL DESIGN, PLANNING, SALES AND DISTRIBUTION OCCUPATIONS

Operations	Related Trade Information
A. Survey area businesses	1. Professional consultants, planners, teachers, etc.
B. Interview employers	2. Managerial and supervisory foreman, and dispatching
C. Interview workers	3. Services of designing, arrangin planning, selling, processing and delivering
D. Write job descriptions	
E. Develop job profiles	

UNIT II MATERIALS AND TOOLS FOR DESIGNING, PLANNING, AND EXPEDITING

Operations	Related Trade Information
A. Selecting flowers	1. Principles of design
B. Selecting arrangement materials	2. Elements of design
C. Developing skills with floral tools	3. Floral materials
D. Displaying floral materials	4. Landscape materials
	5. Promotional materials
	6. Developing the plan

UNIT II MATERIALS AND TOOLS FOR DESIGNING, PLANNING, AND EXPEDITING (cont'd)

Operations	Related Trade Information
E. Planning landscape models	7. Plan models
F. Using landscape supplies	8. Floral supplies
G. Using lighting systems in displaying	9. Landscape supplies
	10. Displaying supplies
H. Making up the sales area	11. Managing light
I. Surveying environmental factors affecting design	12. Environmental factors
J. Dimensioning the landscape	

UNIT III DESIGNING WITH FLOWERS AND DECORATIVE MATERIALS

A. Arranging for balance, proportion, emphasis, rhythm, pattern	1. Principals of flower arrangement
	2. Holding devices, containers and supplies
B. Preparing the container	3. Designing home and hospital arrangements
C. Arranging home and hospital flowers	4. Wedding designs
D. Arranging for weddings	5. Funeral designs
E. Arranging for funerals	6. Hospital arrangements
F. Arranging for holidays and special occasions	7. Holiday and occasion arrangements
G. Arranging with artificials	
H. Making dried arrangements	

UNIT IV MERCHANDISING AND SELLING FLOWERS

A. Using signs, newspaper, and display promotion	1. Promoting
	2. Displaying
B. Marking up prices	3. Pricing
C. Wiring and telephoning flowers	4. Wiring and telephoning
	5. Meeting the customer
D. Making the sales approach	6. The sales demonstration
E. Using product information in selling	7. Product information
	8. Closing the sale
F. Closing the sale	9. Selling flowers for home use
G. Selling flowers for the occasion	10. Selling flowers to business
	11. Selling the wedding
H. Using trade display books	12. Selling the funeral
I. Writing up the order	13. Selling occasion flowers

UNIT V RETAIL FLOWER SHOP MANAGEMENT

A. Determining shop clientele	1. Locating the shop
B. Understand shop financing	2. Capital investment needed
C. Working with others in the shop	3. Personnel management
	4. Shop layout
D. Developing an efficient floor plan and traffic way	5. Packaging for protection and sales appeal
E. Wrapping and packaging	6. Delivery services
F. Dispatching flowers	7. Record keeping
G. Making floral deliveries	
H. Keeping records	

UNIT VI IMPORTANCE OF LANDSCAPING AND LAND USE PLANNING

Operations	Related Trade Information
A. Planning for function, beauty and increased value	1. Landscaping for function
B. Building environmental harmony into land planning	2. Landscaping for beauty
C. Obeying zoning and regulations in landscape work	3. Landscaping for increased propert value
	4. Environmental planning and protection
	5. Zoning and regulating development

UNIT VII ANALYSIS OF LANDSCAPE AND ROOMSCAPE NEEDS

A. Making the site survey	1. Site analysis
B. Interviewing the client	2. Client interview
C. Working with regulating bodies	3. Working with planning commissions
D. Analyzing family landscape needs	4. Analysis of family needs
E. Considering topographical aspects	5. Topographical study
F. Considering social factors	6. Sociological factors
G. Developing the layout and elevation	7. Area layout plan
	8. Elevation perspective

UNIT VIII LANDSCAPING IDEAS AND METHODS FOR AREA TREATMENT

A. Deciding area uses	1. Defining the landscape area
B. Drawing the layout	2. Laying out the landscape area
C. Regarding color, line, form, texture and space	3. Treatment of landscape elements
D. Landscaping the public, private, and service areas	4. Landscaping the public area
E. Utilizing existing features in the landscape	5. Landscaping the private area
F. Landscaping malls and street scenes	6. Landscaping the service area
G. Planning playgrounds	7. Landscaping malls and street scenes
H. Using comprehensive studies and projections	8. Landscaping playgrounds
	9. The arboretum
	10. Planning based upon projected uses

UNIT IX STRUCTURES AND PLANTS

A. Using structures and facilities in the landscape	1. Design of landscape structures and facilities
B. Evaluating structural materials	2. Structural materials
C. Using landscape plants	3. Kinds of plants associated with landscape function
D. Designing the planting plan	4. The planting plan
E. Designing facilities estimating costs	5. Materials listing
F. Making up the planting list	6. Plant listing
G. Making up the materials list	7. Structure and facility list
	8. Cost estimation

UNIT X GARDEN CENTER MERCHANDISING OF HORTICULTURAL MATERIALS AND SUPPLIES

Operations	Related Trade Information
A. Determining garden center clientele	1. Garden center location and layout
B. Arranging the garden center	2. Stocking the garden center
C. Stocking the garden center	3. Displaying in the garden center
D. Displaying lawn and garden merchandise	4. Promotion of merchandise
E. Using signs, newspapers, and display promotion	5. Promotion of services
F. Planning and dispatching services	6. Programming center services
G. Charging for services	7. Dispatching services
H. Pricing	8. Charging for services
I. Being competitive	9. Pricing merchandise
J. Contracting work	10. Packaging and labeling
K. Providing quality work	11. Catalogs and advertising
L. Planning winter programs as snow removal, firewood, tree work, decorating outdoors and indoors, etc.	12. Meeting competition
M. Waiting on customers	13. Winter programs at the garden center
N. Receiving stock	14. Selling policies and credit
O. Shipping merchandise	15. Guarantees and quality control
P. Making the inventory	16. Taking the customer's order
Q. Keeping records	17. Filling the customer's order
R. Accounting	18. Shipping and delivery
S. Programming for safety	19. Receiving merchandise
T. Selling equipment	20. Sales techniques
U. Assembling equipment	21. Inventory
V. Repairing equipment	22. Cost accounting
W. Storing perishable supplies	23. Keeping records
X. Practicing health and sanitation	24. Health and safety regulations and standards
	25. Merchandising horticultural equipment
	26. Assembling equipment
	27. Preparing equipment for sale
	28. Reconditioning equipment
	29. Cold storage
	30. Storing supplies

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Ornamental Horticulture

Shop Practice

(Designing, Interpreting and Selling)

Grade 11

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COURSE OF STUDY OUTLINE

Ornamental Horticulture

Shop Practice

Grade 11

(Based upon student's individualized program)

Greenhouse Operations

Objectives:

1. The student will produce cut flowers, pot plants, and bedding plants in a simulated greenhouse operation.

UNIT I OCCUPATIONS FOUND IN THE GREENHOUSE PRODUCTION BUSINESS

Operations	Related Trade Information
A. Survey area businesses	1. Greenhouse manager
B. Interview employers	2. Production manager
C. Interview workers	3. Physical plant manager
D. Write job description	4. Sales manager
E. Develop job profiles	5. Technician
	6. Foreman
	7. Grower
	8. Grower assistant

UNIT II GREENHOUSE LOCATION, STRUCTURES, AND EQUPMENT

A. Establish new greenhouses	1. Purpose of greenhouse structures
B. Repair greenhouses	2. Location of greenhouse ranges
C. Replace glass	3. Parts of a greenhouse
D. Paint and rustproof	4. The greenhouse range
E. Build coldframes	5. Glazing materials
F. Install heating in hotbed	6. Coldframes
G. Build lathhouses	7. Lathhouses
H. Change bench arrangement	8. Greenhouses benches and beds
I. Construct temporary benching	9. Atmospheric control
J. Control temperature	10. Importance of temperature control
K. Control ventilations	11. Heating systems
L. Control house humidity	12. Cooling systems
M. Inject CO_2	13. Ventilation
N. Set refrigeration levels	14. Control of relative humidity
O. Set up lighting and shading	15. Carbon dioxide enrichment
P. Maintain areas in order	16. Use of combinations of atmospheric controls
Q. Maintain safety standards	17. Refrigerators
	18. Light intensity and duration

UNIT III ENVIRONMENTAL CONTROL

Operations	Related Trade Information
A. Set up potwatering	1. Watering
B. Set up automatic watering controls	2. Relationship of soil and fertilizer
C. Mix soils	3. Soil structure and texture
D. Ammend soils with fertilizers and conditioners	4. Artificial soil mixture
	5. Fertilizer
E. Spray for pests	6. Pest control
F. Fumigate and smoke for pest control	7. Insect control
	8. Disease control
G. Steam soil	9. Weed control

UNIT IV POTTED PLANT PRODUCTION

A. Chrysanthemum	
1. Select varieties	1. Cultivars
2. Set up flowering program	2. Weak group
3. Pinch	3. Crop rotations
4. Feed and water	4. Photoperiod control
5. Potting and repotting	5. Propagation
6. Propagation	6. Potting
7. Regulating heat and light	7. Temperature control
8. Use growth stimulants and retardants	8. Watering
	9. Fertilizing
9. Disbud	10. Pinching
10. Control insects	11. Disbudding
11. Control diseases	12. Growth regulators
12. Practice sanitation	13. Packing and shipping
13. Cutting mature flowers	14. Records
14. Prepare bench for next crop	
15. Keep crop records	
16. Figure profit and loss	
B. Poinsettia	
1. Take cuttings	1. Cultivars
2. Root cuttings	2. Propagation
3. Pot for market types	3. Control of flowering
4. Fertilize and control sales	4. Potting
5. Use automatic water system	5. Watering
6. Time the crop	6. Fertilizing
7. Pinch and stake	7. Temperature control
8. Foil pots and package	8. Pinching
9. Cost out crop	9. Regulating poinsettia growth
10. Keep crop records	10. Packing and shipping
11. Use and store stock plants	

UNIT IV POTTED PLANT PRODUCTION (cont'd)

Operation	Related Trade Information
C. Easter Lily	1. Cultivars
1. Order bulbs	2. Propagation
2. Prepare soils	3. Bulb size
3. Cold treat bulbs	4. Precooling
4. Set up time schedule	5. Planting
5. Pan bulbs by size	6. Fertilizing
6. Fertilize and water	7. Watering
7. Hold back crop	8. Timing
8. Speed up crop	9. Straight stems
9. Use growth regulators	10. Height control
10. Control insects and disease	11. Pests
11. Stake and wrap	12. Packing and shipping
12. Keep crop records	
13. Cost account	
D. Bedding plants	
1. Make starting soil mix	1. Propagation schedule
2. Sanitizing containers	2. Quantities
3. Treating and applying seed	3. Mediums
4. Selecting containers	4. Seed sowing
5. Work pricking off assembly line	5. Moisture
	6. Temperature
6. Direct seeding	7. Containers
7. Labeling containers	8. Fertilizing
8. Pinching and regulating growth	9. Transplanting
	10. Disease control
9. Control pests	11. Purchased seedlings
10. Watering and feeding	12. Culture from transplanting to marketing
11. Sell bedding plants	
12. Provide growing information	13. Marketing
13. Handling and transporting	
14. Keep shipment inventory	
15. Keep records	
16. Cost accounting	
E. Additional Crops	1. Geranium
1. Order cuttings and seed	2. Potted rose
2. Order growing on plants	3. Azalea
3. Dormancy treatment	4. Hydrangea
4. Disease and pest control	5. African violet
5. Using growth regulators	6. Foliage plants
6. Forcing bulbs	7. Spring flowering bulbs
7. Watering and feeding	8. Orchids
8. Potting	
9. Preparing for market	
10. Keeping records and inventory	

UNIT V CUT FLOWER PRODUCTION (CHRYSANTHEMUM, CARNATIONS, SNAPDRAGONS, ROSES, DAISIES)

Operations	Related Trade Information
A. Determine market need	1. Cultivars
B. Prepare benches	2. Crop rotations
C. Plan crop rotation	3. Bench preparation
D. Spacing and planting	4. Planting
E. Supporting	5. Watering
F. Controlling temperature	6. Fertilizing and soil
G. Controlling light	7. Temperature regulation
H. Using growth stimulants	8. Carbon dioxide
I. Pinching and disbudding	9. Pinching
J. Cultivate crop	10. Light control
K. Cutting the crop	11. Pest control
L. Grading and bunching	12. Diseases
M. Marketing	13. Photoperiod control
N. Condition for storage	14. Quality control
O. Dyeing flowers	15. Harvesting
P. Using cold storage	16. Grading
Q. Packaging flowers	17. Bunching, packing, and storage

UNIT VI VEGETABLE PRODUCTION

A. Tomatoes	1. Cultivars
1. Selecting greenhouse varieties	2. Schedules
2. Preparing soil	3. Soil
3. Sterilizing soil	4. Propagation
4. Fertilizing soil	5. Transplanting
5. Growing seedlings	6. Planting
6. Rowing and transplanting	7. Fertilizing
7. Watering and drenching	8. Watering
8. Controlling heat and light	9. Temperature control
9. Injecting CO_2	10. Carbon dioxide
10. Pollinating fruiting crops	11. Pollination
11. Controlling insects, diseases, and pests	12. No smoking
12. Supporting and suckering	13. Plant disorders
13. Harvesting	14. Production in plastic greenhou
14. Keeping records	15. Harvesting and marketing
B. Lettuce	1. Cultivars
1. Prepare benches	2. Rotations
2. Growing transplants	3. Soil preparation
3. Prepare soils	4. Temperature
4. Mark benches and transplant	5. Seeding and transplanting
5. Provide cool temperatures	6. Planting
6. Water and feed	7. Watering
7. Use of CO_2	8. Carbon dioxide
8. Harvest and crate	9. Harvesting, packing, & storage
9. Keep crop records	10. Pest control

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COURSE OF STUDY OUTLINE

Ornamental Horticulture

Shop Theory

Grade 11

(Based upon student's individualized program)

Nursery Production

bjectives:

1. The student will produce landscape plant materials in a simulated landscape nursery.

NIT I OCCUPATIONS IN NURSERY PRODUCTION

Operations	Related Trade Information
A. Survey of area businesses	1. Kind of nurseries
B. Interview employers	2. Scope of the nursery industry
C. Interview workers	3. Development of the nursery business
D. Write job descriptions	4. The nursery business as a career
E. Develop profiles	5. Nursery worker
	6. Nursery clerk-typist
	7. Nursery salesman
	8. Stockman
	9. Nursery foreman
	10. Office manager
	11. Building and storage manager
	12. Plant breeder and propagator
	13. Nursery technician
	14. Nurseryman

NIT II PHYSICAL PLANT AND EQUIPMENT MAINTENANCE

A. Work in different areas	1. The physical plant
B. Selecting growing sites	2. Nursery site selection
C. Plan the nursery layout	3. Nursery arrangement and layout
D. Provide crop rotation	4. Crop rotation
E. Maintain storage and refrigeration for plant materials	5. Refrigeration
F. Operate large equipment	6. Facilities
G. Operate small equipment	7. Large equipment
H. Handle supplies	8. Small equipment
I. Store equipment	9. Supplies
J. Fuel, lubricate and maintain equipment	

UNIT III PROPAGATION OF NURSERY STOCK

Operations	Related Trade Information
A. Selection of propagation stock and seed	1. Selection of propagation stock
B. Starting seed	2. Hardwood, softwood, and semi-hardwood cuttings
C. Starting cuttings	3. Use of the Wardon case technique
D. Using divisions, runners, rhizomes, layering tips and off-shoots	4. Facilities and equipment
E. Treating and storing seed	5. Layerage, runners, off-shoots
F. Field seeding	6. Seed propagation
G. Preparing the seedbed	7. Seed stratification and scarification
	8. Propagation methods for specific plants

UNIT IV GROWING NURSERY STOCK IN THE FIELD

Operations	Related Trade Information
A. Prepare soils and field plots	
B. Plan varieties to plant	1. Field growing methods
C. Mark and line off fields	2. Crop rotation plans
D. Control weeds	3. Soil preparation and modificatic
E. Control rodents and pests	4. Bedding and lining out stock
F. Control disease	5. Transplanting
G. Control insects	6. Watering
H. Prune for health	7. Fertilizing
I. Fertilize and water	8. Pruning and supporting
J. Root prune	9. Root pruning
K. Water and irrigate	10. Controlling weeds
L. Dig and ball and burlap	11. Controlling insects and diseases
M. Handle market stock	12. Winter protection
N. Heel in for holding	13. Culture of specific crop groups
O. Grade and bunch	14. Digging plants B and B and bare-root
P. Lifting perennials, etc.	
Q. Renovate plant plots	15. Holding plants for short periods
R. Keep inventory	16. Grading and packaging

UNIT V GROWING NURSERY STOCK IN CONTAINERS

Operations	Related Trade Information
A. Mix soils and amend soils	1. Plant hardiness
B. Select containers	2. Container growing
C. Grouping plants	3. Selecting containers
D. Practices in container holding	4. Crop succession plans
E. Repotting	5. Growing surfaces
F. Root pruning	6. Growing medium
G. Controlling salt buildup	7. Planting
H. Control of pests and diseases	8. Watering
I. Use winter protection	9. Fertilizer application
J. Select plants for containers	10. Pruning
K. Keep inventory make replacement	11. Control of pests and diseases
	12. Winter protection
	13. Handling containers
	14. Plants commonly grown in containers

UNIT VI MARKETING AND MANAGEMENT

Operations	Related Trade Information
A. Label and inventory	1. Advertising and promotion
B. Make up displays	2. Inventory control
C. Make up sales ads and posters	3. Pricing
D. Grade and package	4. Standard grades
E. Make up bill of sale and shipping orders	5. Labeling
F. Check quarantine regulations	6. Packing and shipping
G. Cost accounting	7. Quarantine laws
H. Provide custom services	8. Functions of management
I. Market supplies	9. Cooperation among employees
J. Market tools	10. Trade associations and publications
K. Market equipment	

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Nursery Production

Grade 11

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COURSE OF STUDY OUTLINE

Ornamental Horticulture

Shop Theory

Grade 11

(Based upon student's individualized program)

Fruit and Vegetable Production
and Marketing for Food and Pleasure

Objectives:

1. The student will produce fruits and vegetables in a simulated produce garden.

2. The student will harvest, handle, display and merchandise horticultural produce in a simulated sales situation.

UNIT I OCCUPATIONS IN HORTICULTURAL PRODUCE PRODUCTION AND MERCHANDISING

Operations	Related Trade Information
A. Survey of area businesses	1. Truck farmer
B. Interview employers	2. Fruit farmer
C. Interview workers	3. Orchardist
D. Write job descriptions	4. Gardener
E. Develop profiles	5. Farm laborer
F. Survey produce markets	6. Broker and jobber
G. Map produce and shipping patterns	7. Inspector and grader
	8. Produce buyer
	9. Produce department manager
	10. Produce worker
	11. Produce transporter
	12. Huckster
	13. Fruit stand operator

UNIT II FRUIT AND VEGETABLE VARIETIES

A. Fresh market fruits for N.J.	1. Fresh market fruits
B. Fresh market vegetables for N.J.	2. Fresh market vegetables
C. Selecting hardiness	3. Produce for processing
D. Selecting resistance and tolerance	4. Varieties as associated with climate and season
E. Seed germination and cleanliness	5. Tolerances and resistances i varieties
F. Planning for use of varieties by season	6. Breeding market quality vege ables
G. Produce varieties for processing crops	7. Breeding market quality frui
	8. Recommended varieties for N.

UNIT III PRODUCTION PLANNING

Operations	Related Trade Information
A. Select planting sites	1. Establishing planting site, plant numbers, plant spacing and expected production
B. Establish crop production	2. Grouping of plants for garden rotation and supply regularity
C. Plan spacing, rotation, and supply needs	3. Determining equipment, tools and supplies
D. Plan labor and capital needs	4. Safe and effective storage and handling of garden supplies
E. Store and handle supplies	
F. Ready equipment for planting	
G. Order seed, plants and supplies	

UNIT IV PROPAGATION OF FRUITS AND VEGETABLES

A. Test and treat seed	1. Seed selection and treatment
B. Calibrate seeding equipment	2. Seeding for transplanting
C. Make direct field seeding	3. Direct field seeding
D. Graft fruit trees	4. Grafting and budding
E. Top work fruit trees	5. Runners, divisions, and layerage
F. Bud fruit trees	
G. Take runners, divisions and layerage canes for planting	

UNIT V GARDEN AND ORCHARD SOIL PREPARATION

A. Marking out the garden plot	1. Turning the soil
B. Plowing,discing and harrowing	2. Using the soil test
C. Fertilizing and adding soil conditioners	3. Conditioning soil for aeration, drainage, and nutrient holding capacity
D. Marking out the rows	4. Working in fertilizers and conditioners
E. Use manures and organics	5. Discing and leveling
	6. Marking the production area
	7. Band and spot placing of starter fertilizers
	8. Understanding fertilizers

UNIT VI STARTING HEALTHY, STRONG PLANTS AT OPTIMAL GROWING CONDITIONS

A. Selecting and buying plants	1. The importance of continued strong growth for maximum plant quality
B. Transplanting garden plants	2. How to transplant garden plants
C. Row seeding	3. How to plant orchard plants
D. Planting bare root trees	4. Space and depth of planting
E. Spacing plants	5. Protecting plant from heat
F. Protecting from heat and cold	6. Protecting plant from cold
G. Spraying	7. Protecting plant from wind
H. Identifying insects and diseases	8. Protecting plant from pests
I. Cultivation and weed control	9. Soil cultivation and weed control
J. Pinching,suckering and training	10. Pinching, suckering and training
K. Pruning for development	11. Pruning and supporting
L. Supporting the plant	

UNIT VII BRINGING THE GARDEN AND ORCHARD INTO PRODUCTION

Operations	Related Trade Information
A. Identifying insects and diseases	1. Control of insects 2. Insect identification 3. Control of diseases 4. Disease identification
B. Spraying and dusting C. Pollinating D. Side dressing fertilizer E. Mulching the crop F. Watering and irrigation G. Pruning for production H. Thinning fruit set I. Spotting nutrient deficiencies	5. Assuring blossom set and qualit production 6. Maintaining soil fertility 7. Mulching practices 8. Irrigation and watering

UNIT VIII CARING FOR THE PRODUCING GARDEN AND ORCHARD

A. Pruning and plant renovation B. Controlling insects and diseases C. Gathering fruit D. Gathering vegetables E. Replacing and rotating plants	1. Maintaining orchard health duri production 2. Maintaining garden health durin production 3. Renovation techniques 4. Harvesting of mature fruit 5. Harvesting of vegetables

UNIT IX DETERMINING QUALITY IN FRUIT AND VEGETABLE PRODUCE

1. Post harvest care
2. Storage and refrigeration
3. Packaging and prepackaging
4. Grading standards for vegetable
5. Grading standards for fruits
6. Exhibiting and displaying

UNIT X MERCHANDISING FRUITS AND VEGETABLES

1. Convenient and effective product stores
2. Roadside stands
3. Advertisement
4. Packaging and displaying
5. Cleaning and weighing
6. Sorting and grading
7. Consumer buying habits
8. Renovating the display
9. Ordering and stocking
10. Making the sales transaction
11. Using the telephone
12. Buying wholesale
13. Keeping records

UNIT XI MECHANICS USED IN FRUIT AND VEGETABLE PRODUCTION AND MARKETING

Operations	Related Trade Information
	1. Repair and care of hand tools
	2. Cold metal work
	3. Burning and welding
	4. Refrigeration
	5. Plumbing
	6. Equipment repair
	7. Electrical controls
	8. Motorized equipment
	9. Gasoline engines

UNIT XII FRUIT AND VEGETABLE CROPS

1. Small fruits
2. Vineyard crops
3. Drupe fruits
4. Pome fruits
5. Nut fruits
6. Citrus and tropic fruits
7. Cole crops
8. Salad crops
9. Herbs
10. Cucurbits and vine crops
11. Solanaceous crops
12. Legumes
13. Corn
14. Garden perennials
15. Pot herbs
16. Root crops
17. Bulb

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COURSE OF STUDY OUTLINE

Ornamental Horticulture

Shop Theory

Grade 12

Agri-Business, Horticultural Supplies, Horticultural Services, Horticultural Mechanics, and On-The-Job Work Experience

Objectives:

1. The student will establish the habit of reviewing specific references and studies, using current information sources, and applying ideas in a functional manner.

2. The student will calculate and establish costs and relate costs to production or service values as applied in horticultural industries and horticultural businesses.

3. The student will experience leadership in a simulated horticultural services program while assuming the duties of a foreman.

4. The student will experience leadership in a management capacity in a simulated horticultural business situation.

5. The student will gain 600 hours of on-the-job training in a horticultural business or industry if possibilities allow placement.

6. The student will be able to solve problems in handling supplies, servicing equipment, and in merchandising associated with the ornamental horticulture occupation.

UNIT I LEARNING TO KNOW THE FREE ENTERPRISE SYSTEM

Operations	Related Trade Information
A. Seeking the job	1. Managerial and operational job areas
B. The job interview	2. Qualifications required for managerial and operational jobs
C. Preparation for the job	3. What is the free enterprise system
D. Serving on the job	4. Advantages and disadvantages
E. Being the foreman	5. Other major economic systems
F. Serving operational jobs	6. Understanding inputs-outputs
G. Accounting business inputs	7. Importance of competition
H. Accounting business outputs	8. Levels of competition
I. Meeting competition	9. Types of business ownership
J. Developing ownership agreements	10. Agri-business in the community
K. Measuring community value of a business	

UNIT II PLANNING AND MANAGING RESOURCES IN AGRI-BUSINESS

Operations	Related Trade Information
A. Managing capital	1. Capital
B. Managing labor	2. Labor
C. Responsibilities of management	3. Management
D. Operating facilities and equipment for opening, operation, and for closing	4. Understanding facilities and equipment
E. Planning the business	5. What is business planning
F. Financing a business	6. What has to be planned at each job level
G. Business planning	7. Planning before entering business
H. Setting business goals	8. Planning for adequate finance
I. Measuring performances	9. Planning - a continuing process
	10. Planning for products, supplies and services
	11. Setting goals and measuring performance

UNIT III UNDERSTANDING THE MANAGEMENT FUNCTION

A. Decision making process	1. Importance of decision-making
B. Supervising	2. The functions of management
C. Managing	3. Successful management means a successful business
	4. Supervision

UNIT IV MONEY MANAGEMENT AND THE NEED FOR PROFIT

A. Itemizing capital needs	1. The need for adequate capital
B. Paying interest	2. Cost of capital
C. Budgeting	3. Budgeting
D. Paying taxes and insurance	4. Taxes and insurance
E. Determining price margins	5. Pricing and margins
F. Setting prices	6. Determining prices
G. Using credit	7. Credit in the business
H. Keeping records	8. Records and reports
I. Making inventory and supply reports	9. Profit centers
J. Managing profits	10. Selected factors for business success
K. Measuring success	

UNIT V PEOPLE MAKE OR BREAK THE BUSINESS

A. Determing employee benefits insurance, retirement, health plan, workman's compensation, vacation, sick pay etc.	1. The employee as an individual
B. On the job work habits	2. The employee on the job
C. Filling a responsibility	3. The job in the business organization
D. Leadership	4. Employee contribution to busine success
E. Getting promotions	5. Taking roles of leadership in the business
F. Continuing training	6. Advancing in the career
G. Following job specifications and work orders	7. Upgrading skills and ability
	8. Work specifications

UNIT VI GETTING TO KNOW THE MARKET PLACE

Operations	Related Trade Information
A. Interviewing the consumer	1. The market study
B. Stock turnover counting	2. Forecasting
C. Forecasting market	3. Cost and inventory control
D. Controlling costs	4. Measuring customer satisfaction
E. Servicing the customer	5. Self service
F. Unit packaging	6. Packaging

UNIT VII AGRICULTURAL ECONOMICS

A. Understanding pricing and laissez-faire system	1. Prices
B. Economics of supply	2. Supply
C. Economics of demand	3. Demand
D. Market elasticity	4. Equilibrium theory of prices
	5. Concepts of elasticity

UNIT VIII AGRICULTURAL COMMUNICATIONS

A. Using trade publications	1. Trade publications
B. Applying scientific publications	2. Scientific publications
C. Following consumer publications	3. Consumer publications
D. Communication techniques	4. Advertising and sales
	5. Use of mass media
	6. Value of image
	7. Cooperative action

UNIT IX AGRICULTURAL CREDIT AND FINANCE

A. Determining credit policy	1. Credit policies
B. Money management	2. Capital and financial management
C. Reading a financial statement	3. Financial statements
D. Using financial statements	4. Analysis of financial statements
E. Investing for profit	5. Break-even analysis
F. Playing management games	6. Managing investments
	7. Management games

UNIT X AGRICULTURAL MACHINERY SALES AND SERVICES

A. Determining volume of business in machinery sales and services	1. Opportunities in farm and garden machinery sales and services
B. Relating to a customer	2. Effective communication with the prospective employer
C. Selling your abilities	3. How to meet the customer
D. Product selling	4. Selling machinery
E. Using sales techniques	5. Selling mechanic services
F. Selling services	6. Selling custom work
G. Planning custom work	7. Pre-delivery and delivery servicing
H. Pre-delivery services	8. Parts ordering
I. Delivery services	9. Parts selling
J. Ordering parts	10. Using repair manuals
K. Selling parts	11. Making company change orders
L. Using the parts catalog	12. Servicing customer sales
M. Using the repair manual	
N. Making change orders	
O. Servicing your merchandise	

UNIT XI MEETING SUPPLY AND SERVICE NEEDS IN AGRI-BUSINESS

Operations	Related Trade Information
A. Selecting tools	1. Types and uses of tools
B. Merchandising tools	2. Innovations in tools
C. Fitting tools	3. Fitting tools
D. Repairing tools	4. Repairing tools
E. Selecting gasoline engines	5. Types and uses of gasoline engi
F. Engine use	6. Engine ratings and uses
G. Making first maintenance service	
H. Making second maintenance service	7. First maintenance services 8. Second maintenance services
I. Making third maintenance service	9. Third maintenance services
J. Motor loading	10. Motor ratings and uses 11. Motor loading
K. Motor overhaul	12. The motor overhaul
L. Lubricating	13. The diesel system
M. Overhauling hydraulic power systems	14. Function and types of lubricant 15. Use of gear oil and grease
N. Charging the hydraulic systems	16. Lubricating procedures 17. Operation of hydraulic power
O. Adjusting equipment	18. Overhauling hydraulic systems
P. Calibrating equipment	19. Use of hydraulic oils
Q. Repair equipment R. Winterize equipment	20. Adjustment and calibration of auxiliary equipment
S. Overhaul equipment	21. Protecting equipment
T. Tune up and adjustment	22. Repair of equipment
U. Winterizing and cleaning cooling systems	23. Overhaul of equipment 24. Tractor tune-up
V. Repair tractors	25. Valve adjustment
W. Plan wiring	26. Ignition adjustment
X. Blueprint reading	27. Air, fuel, and exhaust adjustme
Y. Ordering materials	28. Maintaining the cooling system
Z. Making up material orders	29. Brakes, clutch, and wheel adjus ment
AA. Using refrigeration	
BB. Welding and cutting	30. Tractor repair
CC. Plumbing	31. Equipment storage
DD. Carpentering	32. Planning farm wiring
EE. Work with cement and mortar	33. Electrical supplies 34. Construction blueprint reading 35. Carpentry materials 36. Carpentry materials order 37. Planning plumbing systems 38. Irrigation delivery ability 39. Plumbing materials 40. Handling cement and mortar 41. Mixing cement and mortar 42. Planning concrete construction 43. Setting up concrete forms 44. Applications of arc welding 45. Applications of oxy-acetylene welding 46. Use of welding and cutting equipment 47. Planning for refrigeration 48. Maintenance of refrigeration

BIBLIOGRAPHY OF TEXTS AND REFERENCES

Ornamental Horticulture

Shop Practice

Grade 12

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Farm Equipment Retailer's Handbook. A.S. Merrifield, Farm Equipment Retailing Inc., St. Louis, Missouri

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How We Organize to do Business in America. National Education Association, Washington

Implement and Tractor Service Manual. Kansas City, Mo. Implement and Tractor Publications, Inc.

Maxwell, Joe E. Successful Small Business Management. Eastern Kentucky Resource Development, Extension Service, University of Kentucky, Lexington, Kentucky

Mechanics Study Guide-Transmission Theory. Industrial Service Department, J. I. Case Co., Racine, Wisc.

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Roy, Paul E. Exploring Agri-Business. Interstate, Danville, Illinois, 1967

Russell, Engberg, C. Financing Farmer Cooperatives. Banks for Cooperatives, Baltimore, Md. 1965

Rutgers University College of Agriculture and Environmental Science New Jersey Manpower Needs in Natural Resources and/or Agriculture. Rutgers University, New Brunswick, N.J. 1972

SaLoutos, Charles. ABM, Agri-Business Management. Wisconsin State University, Platteville, Wisconsin, 1967

Schwab, Frevert & Barnes, Manual of Soil and Water Conservation Engineering. Wiley & Sons, Inc., Somerset, N.J. 1966

Smith, Frank J., and Ken Cooper. The Financial Management of Agri-Business Firms. Federal Extension Service, Washington 1967

Willson, Robert A., and Frank J. Smith. Managing the Agri-Business Firm. Federal Extension Service, Washington 1967

COURSE OF STUDY OUTLINE

Ornamental Horticulture

Applied Mathematics

Grade 10

Objectives:

1. To review the basic concepts of arithmetic.
2. To learn some basic concepts of algebra.
3. To apply these concepts in solving problems relating to the ornamental horticulture trade.

UNIT I REVIEW OF THE FUNDAMENTALS OF MATHEMATICS

A. Review of whole numbers

1. Operations

a. Addition
b. Subtraction
c. Multiplication
d. Division

2. Trade applications

B. Review of fractions

1. Concept of fractions
2. Reduction
3. Operation

a. Addition
b. Subtraction
c. Multiplication
d. Division

4. Trade application

C. Review of decimals

1. Basic concepts
2. Conversions

a. Fractions to decimals and vice versa

3. Operations

a. Addition
b. Subtraction
c. Multiplication
d. Division

C. Review of decimals (cont'd)

4. Tables of decimal equivalents
5. Trade applications

D. Review of percentage

1. Basic concepts
2. Conversions

a. From fractions and decimals

3. Trade applications

E. Units of measure (English and metric systems)

1. Tables of measurements
2. Conversions
3. Measuring devices and instruments
4. Linear measurement
5. Liquid measurement
6. Weight measurement
7. Surface measurement

a. Square
b. Rectangular
c. Triangular
d. Trapezoidal
e. Circular

8. Trade applications

UNIT II GRAPHS

A. Development and interpretation of graphs and charts

1. Line graphs
2. Bar graphs
3. Circle graphs
4. Picto graphs

B. Trade uses and applications

UNIT III FUNDAMENTALS OF APPLIED ALGEBRA - SYMBOLS

A. Concepts of symbols
B. Application of symbols in addition
C. Application of symbols in subtraction
D. Application of symbols in multiplication
E. Application of symbols in division

UNIT IV FUNDAMENTALS OF APPLIED ALGEBRA - SIGNED NUMBERS

A. Meaning of signed numbers
B. Addition of signed numbers
C. Subtraction of signed numbers
D. Multiplication of signed numbers
E. Division of signed numbers
F. Graphic representation of signed numbers

UNIT V FUNDAMENTALS OF APPLIED ALGEBRA - EQUATIONS

A. Concept of equations
B. Positive and negative quantities
C. Solving equations by

1. Addition, subtraction, multiplication, division

D. Solving problems with equations

UNIT VI FUNDAMENTALS OF APPLIED ALGEBRA - EXPONENTS

A. Concepts of exponents
B. Multiplication and division of numbers and letters

UNIT VII FUNDAMENTALS OF APPLIED ALGEBRA - RADICALS

A. Simplification
B. Combination
C. Square roots of

1. Whole numbers, fractions and algebraic numbers

UNIT VIII FUNDAMENTALS OF APPLIED ALGEBRA - FORMULAS

A. Concept of formulas
B. Application of formulas to square, rectangles, triangles, regular solids, circles, parts of circles.

UNIT IX RATIO AND PROPORTION

A. Concepts or ratio and proportion
B. Applications of ratio and proportion

1. Direct
2. Indirect
3. In solutions, mixtures, etc. used in horticulture

BIBLIOGRAPHY OF TEXT AND REFERENCE BOOKS

Ornamental Horticulture

Applied Mathematics

Grade 10

Stein, Edwin-Algebra In Easy Steps, D. Van Nostrand Co., Inc. New York, 1961

Stein, Edwin - Fundamentals of Mathematics, Modern Edition - Allyn and Bacon, Inc., Rockleight, N.J. 1968

Slade, Samuel and Louis Margolis - Mathematics for Technical and Vocational Schools, Fourth Edition, John Wiley and Sons, 1955.

COURSE OF STUDY OUTLINE

Ornamental Horticulture

Applied Geometry

Grade 11

Objectives:

1. To learn certain basic principles of geometry.
2. To learn how to perform certain geometric functions.
3. To learn how to apply these functions and principles toward solving problems in the field of ornamental horticulture.

UNIT I REVIEW OF ALGEBRA

A. Pre-test
B. Algebraic concepts

UNIT II INTRODUCTION TO GEOMETRY

A. Points, lines and planes
B. Angles

1. Types
2. Measurement
3. Addition and subtraction of angles

C. Circles

1. Radius, diameter and circumference in English and Metric
2. Arcs and chords
3. Tangents and secants

D. Construction

1. Use of compass and protractor
2. Bisecting angles
3. Constructing perpendiculars
4. Constructing triangles

UNIT III TRIANGLES

A. Right triangles

1. Pythagorean theorem
2. Angle relationships

UNIT III TRIANGLES (cont'd)

B. Isosceles

1. Ratio and proportion
2. Similar and congruent triangles

C. Equilateral

1. 30 - 60 - 90 degree relationships

D. Acute, obtuse and scalene

E. Calculation of perimeter and area in English and Metric

UNIT IV PARALLEL LINES AND QUADRILATERALS

A. Interior and exterior angles
B. Squares and rectangles
C. Parallelograms
D. Trapezoids
E. Rhombi
F. Calculation of perimeter and area in English and Metric

UNIT V REGULAR POLYGONS

A. Types
B. Diagonals
C. Central, interior and exterior angle relationships
D. Number of sides to size of central angle relationships
E. Calculations of perimeter and area in English and Metric

UNIT VI CIRCLES

A. Meaning of pi
B. Central angles
C. Radian measurement
D. Arcs and sectors
E. Calculation of circumference and area in English and Metric

UNIT VII LOCATION OF POINTS AND OBJECTS

A. Points equidistant from a given point
B. Points equidistant from a given line
C. Points equidistant from two given points
D. Points equidistant from the intersection of two lines

UNIT VIII SOLIDS

A. Prisms
B. Rectangular solids

   1. Cubes

C. Pyramids
D. Cylinders
E. Cones
F. Spheres
G. Calculations of lateral areas and volumes in English and Metric.

BIBLIOGRAPHY OF TEXT AND REFERENCE BOOKS

Ornamental Horticulture

Applied Geometry

Grade 11

Stein, Edwin - Fundamentals of Mathematics, Allyn and Bacon, In., Rockleigh, N. J. 1968

Toft, Robert and Dominic Lally - Applied Geometry, Middlesex County Vocational and Technical High Schools, 1960

Dressler, Isadore - Review Text In Preliminary Mathematics, Amsco School Publications, Inc., New York 1962

COURSE OF STUDY OUTLINE

Ornamental Horticulture

Consumer Mathematics

Grade 12

Objectives:

The student will

1. Learn how to be a better purchaser.

2. Learn how to use and manage his income to the best advantage.

3. Learn and appreciate the importance of mathematics as applied to the horticulture field.

UNIT I SMALL BUSINESS OPERATION

A. Common business terms and problems involving -

1. Profit and loss
2. Net worth
3. Gross income
4. Discount
5. Margin
6. Statements

a. Profit and loss
b. Balance sheet

7. Mark up

B. Wages - how computed

1. Payroll

C. Taxes - definition and problems involving

1. Income - state and/or federal
2. Sales
3. Social Security
4. Unemployment
5. Hidden taxes

D. Insurance

1. Workman's compensation
2. Liability and property
3. Life
4. Automobile
5. Blue Cross, Blue Shield, Major Medical and similar medical insurances

UNIT II BUSINESS FORMS AND RECORDS - PROBLEMS INVOLVING -

A. Invoice and statement
B. Receipt of delivery
C. Discount

1. Trade and cash

D. Banking forms

1. Deposit slips
2. Checks

a. Various kinds

3. Bank statements

a. Types

E. Sales slips
F. Tax forms

1. Types

G. Making a bill
H. Inventory records

UNIT III MANAGING MONEY

A. Budgeting
B. Planning and using a budget
C. Using credit

1. Using retail credit
2. Installment credit
3. Borrowing money

a. Figuring interest and other costs

4. Building a credit rating

D. Saving and investing money

UNIT IV BASIC BUSINESS LAW

A. Contracts
B. Leases
C. Laws protecting the purchaser
D. Ownership of business

1. Single
2. Partnership
3. Corporation

UNIT V PROBLEMS INVOLVING PURCHASE AND MAINTENANCE OF SUPPLIES, EQUIPMENT AND OTHERS

A. Seed, bulbs, tubers, etc.
B. Fertilizers
C. Spray equipment
D. Irrigation and watering equipment
E. Heat
F. Light
G. Phone
H. Insecticides and pesticides
I. Delivery equipment (car and/or truck)
J. Flats, pots, etc.
K. Miscellaneous

BIBLIOGRAPHY OF TEXT AND REFERENCE BOOKS

Ornamental Horticulture

Consumer Mathematics

Grade 12

Hailes, William and Raymond Hubbard - Small Business Management, Delmar Publishers, Albany, N.Y. 1965

Richert, G. Henry, Warren Meyer and Peter Haines - Retailing, Principles and Practices, McGraw Hill, N.Y. 1962

Shilt, Bernard and W. H. Wilson - Business Principles and Management, Southwestern Publishing Co., Cincinnati, Ohio, 1961

Smith, Frank and Ken Cooper - The Financial Management of Agri-Business Firms. Federal Extension Service, Washington, D.C., 1967

COURSE OF STUDY OUTLINE

Ornamental Horticulture

Biology

Grade 10

Objectives:

1. To develop an understanding of the science of life.
2. To develop the art of investigation so that it will add to knowledge.
3. To understand the unifying principles of evolutionary development of plants and animals from the simplest to the most complex forms.
4. To develop a better understanding of life around us and how it relates to our environment and to the field of ornamental horticulture.

UNIT I LIVING THINGS IN THEIR ENVIRONMENT

A. A Study in Interdependence

1. Fresh-water communities
   a. Life in a pond
   b. Life in a swiftly flowing stream
   c. Life in a deep lake
   d. Relating the concepts
2. Marine communities
   a. Fresh-water and marine environments
   b. Life in the shallow and the deep
   c. Food chains and their links
   d. Relating the concepts
3. Land Communities
   a. Land masses, climates and life
   b. Life from high to low
   c. The conservation of energy and interdependence
   d. The conservation of matter and interdependence
   e. Relating the concepts

UNIT II THE ORGANIZATION OF LIVING THINGS

A. Cells as Building Blocks

1. Basic units of life
2. "Free-living" cells
3. Cells as parts of multicellular organisms
4. Relating the concepts

B. Multicellular Animals as Organisms

1. Body systems of an organisms - the frog
2. Body systems of man - the skeletal system
3. Body systems of man - the muscular system
4. Body systems of man - the nervous system
5. Body systems of man - the digestive system
6. Body systems of man - the circulatory system
7. Body systems of man - the respiratory and excretory systems
8. Relating the concepts

C. Multicellular Plants as Organisms

1. The structure and function of the leaf
2. The structure and function of the stem
3. The structure and function of the root
4. Relating the concepts

UNIT III THE WORK OF CELLS

A. Cells as chemists

1. The cell and its living stuff

B. Cells in Balance

1. Maintaining balance in food substances
2. The cell in balance
3. Regulation of the body by cells

C. The Capture of Energy by Cells

1. A basic process
2. Phtosynthesis
3. Relating the concepts

UNIT IV PLANTS: VARIETY IN FORM

A. The Thallophytes - Chained to Waters

1. The grass of the waters
2. Variety and grouping

UNIT IV PLANTS: VARIETY IN FORM (cont'd)

3. Reproduction in the thallphytes
4. Dependent thallophytes - the fungi
5. Relating the concepts

B. The Bryophytes and Ferns - A Foothold on Land

1. Plants with a tie to water
2. The evidence of a past life
3. Early land plants
4. Relating the concepts

C. The Seed Plants

1. The gymnosperms
2. Angiosperms with two seed leaves
3. Angiosperms with one seed leaf
4. Reproduction in flowering plants
5. Relating the concepts

UNIT V THE CONTINUITY OF LIFE

A. Continuity and Change in Organisms

B. Changing Man and the Changing Environment

C. Life - What of the Future Environment

BIBLIOGRAPHY OF TEXT AND REFERENCE BOOKS

Ornamental Horticulture

Biology

Grade 10

Brandwein, P.. Stollberg, Greenstone, Yasso, Drovey, Life - Its Forms and Changes. Harcourt Brace, Inc., 1972

Gregory, W., Goldman, Biological Science, Ginn and Co., 1965

Winchester, A.M., Biology, Van Nostrand Co., 1961

COURSE OF STUDY OUTLINE

Ornamental Horticulture

Related Physics

Grade 11

Objectives:

1. To understand the role of science in new developments and to develop an appreciation of the importance of physics in our modern world.
2. To learn how some basic principles of physics are applied to the field of ornamental horticulture.

UNIT I INTRODUCTION

A. The Importance of Science

1. In everyday life
2. In ornamental horticulture

B. The Scientific Method

UNIT II MEASUREMENT

A. English and Metric Systems

1. Common units of

a. Distance
b. Weight
c. Length
d. Volume

2. Use of

a. Meter stick
b. Ruler
c. Vernier caliper
d. Calibrated graduates
e. Beam balance

UNIT III MATTER

A. General Properties
B. Solids

1. Special properties of solids
2. Density

a. Iron and steel
b. Copper
c. Aluminum

UNIT III MATTER (cont'd)

d. Wood
e. Plastics
f. Glass

C. Liquids

1. General properties of liquids
2. Specific gravity

a. Water
b. Alcohol
c. Storage battery electrolyte
d. Anti-freeze solutions

3. Expansion and contraction

a. Peculiar action of water at 4°C.

4. Solutions
5. Suspensions

D. Gases

1. General properties of gases
2. Compression
3. Expansion and contraction

UNIT IV FORCES

A. Types and Effects of Forces
B. Force Vector
C. Work
D. Energy
E. Power

1. Horsepower
2. Transmission of power

F. Balance and Equilibrium

1. Center of gravity

UNIT V SIMPLE MACHINES

A. Levers

1. Three classes

B. Inclined Plane
C. Wheel and Axle
D. Pulleys
E. Gears and Gear Trains
F. Friction
G. Efficiency
H. Mechanical Advantage

UNIT VI AIR

A. Pressure

1. Cause of
2. Measurement
3. Uses

B. Pumps

1. Lift
2. Force
3. Centrifugal

C. Bernoulli's Principle

1. Applications

a. Carburetor
b. Sprayer

D. Pneumatic Machines

UNIT VII HEAT AND TEMPERATURE

A. Cause and Nature of Heat
B. Measurement of Heat

1. Calorie
2. B.T.U.

C. Specific Heat
D. Expansion and Contraction Due to Heat

1. The thermostat
2. The thermocouple
3. Coefficient of linear expansion
4. Coefficient of volume expansion

E. Temperature

1. Measurement of temperature

a. Fahrenheit scale
b. Centigrade (Celsius) scale

F. Heat Transfer

1. Conduction
2. Convection
3. Radiation

UNIT VII HEAT AND TEMPERATURE (cont'd)

G. Evaporation

1. Effect of evaporation on temperature

H. Humidity

1. Effects on

a. Plants and animals

2. Control of

I. Boiling and Melting Points

1. Effect of pressure on

J. Insulation
K. Heat Engines

1. Two-cycle
2. Four-cycle
3. Cooling systems and their importance

UNIT VIII LIGHT

A. Properties
B. Nature and Measurement

1. Speed
2. Candlepower
3. Foot candle
4. Lumen

C. Refraction
D. Reflection
E. Diffusion
F. The Solar Spectrum
G. Lenses

1. Convex
2. Concave
3. Combinations
4. Focal length

H. Artificial Light

1. Incandescent lamps
2. Fluorescent lamps

UNIT VIII LIGHT (cont'd)

I. Law of Inverse Squares
J. Color

1. Primary, secondary, tertiary colors
2. Harmonics of color

UNIT IX MAGNETS AND MAGNETISM

A. Natural and Artificial Magnets
B. Laws of Magnetism

1. Like and unlike poles

C. Theory of Magnetism
D. Electromagnets
E. Magnetic Field

1. Of magnet
2. Surrounding a wire carrying a current

F. Solenoids

1. Uses

UNIT X FUNDAMENTALS OF ELECTRICITY

A. Kinds of Electricity

1. Static
2. Dynamic

B. Electric Currents

1. Direct
2. Alternating

C. Conductors and Insulators
D. Measurement of Electricity

1. Volts, amperes, ohms, watts

E. Circuits

1. Series, parallel, compound
2. Use of fuses and circuit breakers

F. Cells

1. Wet, dry, storage

UNIT X FUNDAMENTALS OF ELECTRICITY (cont'd)

G. Generating Electricity

1. A.C. and D.C. generators

a. Parts and function

H. Electric Motors

1. A.C. and D.C.

a. Parts and function

BIBLIOGRAPHY OF TEXTS AND REFERENCE BOOKS

Ornamental Horticulture

Related Physics

Grade 11

Brandwein, Stollberg, Burnett. Energy - Its Forms and Changes. 1968, Harcourt, Brace and World, Inc.

Nelson and Brandwein. A Searchbook - Energy. 1970, Harcourt, Brace Jvanovich, Inc.

Olivo, C. Thomas and Alan Wayne. Fundamentals of Applied Physics. 1968, Delmar Publishers

COURSE OF STUDY OUTLINE

Ornamental Horticulture

Related Chemistry

Grade 12

Objectives:

1. To learn certain basic fundamentals of chemistry and how they apply to ornamental horticulture.
2. To understand that chemistry is not an abstract science but a practical body of knowledge directly related to everyday experiences and interests.

UNIT I GENERAL INTRODUCTION

A. Structure of Matter

1. Atoms
2. Molecules
3. Protons, electrons, neutrons

B. Elements
C. Compounds and Mixtures
D. Atomic Radiation

1. Alpha, Beta, Gamma rays

E. States of Matter

1. Solid, liquid, gas

F. Effect of Temperature and Pressure On

UNIT II SOLUTIONS AND SUSPENSIONS

A. Characteristics

1. Physical
2. Chemical

B. Concentration of Solutions

1. Molarity

C. Conductivity of
D. Factors Affecting Solubility

UNIT II SOLUTIONS AND SUSPENSIONS (cont'd)

E. Supersaturated Solutions
F. Distillation
G. Electrolytic Dissociation
H. Hydrogen Ion Concentration

1. pH

a. Application to soil testing for acidity or alkalinity
b. Use of lime
c. Use of sulfur ammonium sulfate and aluminum sulfate

UNIT III OXYGEN

A. Properties Of
B. Preparation Of

1. Laboratory methods
2. Commercial methods

C. Oxidation

1. Rapid
2. Slow

D. Presence in Atmosphere

1. Importance of plants

E. Oxidizing Agents

UNIT IV HYDROGEN

A. Properties Of
B. Preparation Of

1. In the laboratory
2. Commercially

C. Uses Of

1. In horticulture
2. In industry

D. Common Compounds of Hydrogen

1. Hydroxides
2. Carbohydrates
3. Proteins and amino acids

UNIT V ACIDS, BASES AND SALTS

A. Acids

1. Common acids
2. Chemical make-up
3. Physical properties
4. Chemical properties
5. Common acids used in horticulture field

a. Uses
b. Reasons for use

B. Bases

1. Common bases
2. Chemical make-up
3. Physical properties
4. Chemical properties
5. Common bases used in horticulture field

a. Uses
b. Reasons for use

C. Salts

1. Common salts
2. Chemical make-up
3. Physical properties
4. Chemical properties
5. Common salts used in horticulture field

a. Uses
b. Reasons for use

D. Neutralization

UNIT VI PHOSPHORUS, POTASSIUM AND NITROGEN

A. Phosphorus

1. Physical and chemical properties
2. Symbol
3. Common compounds and uses in horticulture

a. The phosphates
b. Phosphoric acid
c. Monoammonium phosphate
d. Diammonium phosphate

UNIT VI PHOSPHORUS, POTASSIUM AND NITROGEN (cont'd)

4. Lack of phosphorus in plants

a. Symptoms

B. Potassium

1. Physical and chemical properties
2. Symbol
3. Common compounds and uses in horticulture

a. Potassium sulfate
b. Others

4. Lack of potassium in plants

a. Symptoms

C. Nitrogen

1. Physical and chemical properties
2. Symbol
3. Common compounds and uses in horticulture

a. Ammonium nitrate
b. Other nitrates
c. Other nitrogen compounds

4. Nitrogen producing plants
5. Lack of nitrogen in plants

a. Symptoms

UNIT VII CALCIUM, MAGNESIUM AND SULFUR

A. Physical and Chemical Properties
B. Symbols
C. Use of Lime
D. Compounds Containing Magnesium and Sulfur

1. Uses

E. Lack of Calcium,Magnesium and Sulfur in Plants

1. Symptoms

UNIT VIII TRACE ELEMENTS

A. Iron, Zinc, Boron, Copper, Manganese and Molybdenum

1. Physical and chemical properties
2. Uses of each
3. Lack of each in plants

a. Symptoms

UNIT IX METABOLIC SUBSTANCES

A. Carbohydrates

1. Sugars
2. Starch
3. Cellulose
4. Pectins
5. Resins
6. Others

B. Proteins
C. Lipids
D. Organic Acids and Alcohols
E. Aromatic Compounds

1. Phenolic compounds

a. Vanillin
b. Methyl salicylate
c. Others

2. Volatile phenolic compounds

F. Lignins and Tannins
G. Terpenoids and Steroids
H. Alkaloids

1. Common compounds and uses

UNIT X PLANT GROWTH CONTROL

A. Importance of the Auxins

1. Discovery of
2. Chemical nature
3. Principal auxin

a. Indoleacetic acid

4. Synthesis and destruction
5. Translocation
6. Effect on cell elongation
7. Phototropism
8. Rooting
9. Fruit development
10. Herbicidal action

UNIT XI PESTICIDES

A. Classification

1. Systemic
2. Non-systemic

UNIT XI PESTICIDES (cont'd)

B. Insecticides and Fungicides

1. Stomach poisons
2. Contact poisons
3. Inorganic, organic, synthetic

a. Names of common insecticides
b. Uses of

4. Dusts, solutions, fumigants

C. Problems of Chemical Control
D. Weed and Undesirable Plant Killers
E. Safety Precautions to Follow

BIBLIOGRAPHY OF TEXTS AND REFERENCE BOOKS

Ornamental Horticulture

Related Chemistry

Grade 12

Bonner, James and Galston, Arthur, Principles of Plant Physiology, 1966, W. H. Freeman and Company

Janick, Jules. Horticultural Science, Second Edition, 1972, W. H. Freeman and Company

Plant Diseases, the Yearbook of Agriculture, U.S. Dept. of Agricultur Washington, D.C.

Tree Fruit Production Recommendations 1973. College of Agriculture, Rutgers University

Cornell Recommendations for Commercial Floriculture Crops. Part II: Disease, Pest and Weed Control, Cornell University, 1974

1971 Pennsylvania Guide for Agricultural Chemicals for Vegetable Crop Pennsylvania State University

COURSE OF STUDY OUTLINE

Ornamental Horticulture

Related Drawing and Art

Grade 10

Objectives:

1. To develop sufficient understanding of the art principles in design - Harmony, Emphasis, Balance, Proportion, and Rhythm.
2. To develop the ability to letter neatly and to make effective signs and posters.
3. To learn how to draw shrubs, trees, flowers, and textures, and other subjects suitable to ornamental horticulture.
4. To develop an understanding of the principles of color and design as they apply to the field, particularly in floral design and display.
5. To develop critical judgment in choosing color, pattern, and texture.
6. To develop a knowledge of historic art styles and their influence on present-day design.
7. To experiment with a variety of art media, materials, and tools in art and craft work as they relate to the field.

UNIT I USE OF DRAWING INSTRUMENTS

A. Drawing Board and T-square
B. Scales
C. Triangles
D. Compasses and Dividers
E. Protractors

UNIT II BASIC DRAWING

A. Standards and Principles
B. Lettering
C. Orthographic Projection
    1. Object
    2. Point of sight
    3. Projection lines
    4. Projection plane
    5. Angles of projection

UNIT III WORKING DRAWINGS

A. Pictorial Drawings

1. Isometric
2. Oblique

B. Slanting Surfaces
C. Invisible Edges
D. Half-size Scales
E. Cylindrical Objects
F. Two-view Drawings
G. Orthographic Projection

UNIT IV LETTERING

A. Basic Lettering Styles

1. Gothic
2. Roman
3. Text
4. Novelty

B. Spacing
C. Practice in Freehand Lettering with Pencil, Pen-and-ink, Tempera, and Markers
D. Poster Design (Harmony of all elements)

1. Formal and informal balance
2. Proportion
3. Emphasis
4. Rhythm

UNIT V COLOR

A. Properties of Color

1. Physical properties, and the fundamentals of mixing tones

a. hue
b. value
c. intensity

2. Psychological properties of color, and application to suit purpose

a. emotional stimulus (Example: warm, cool)
b. perceptual stimulus (Example: advancing, receding)

B. Color Schemes and Color Harmony

1. Monochromatic
2. Analogous
3. Triad
4. Complementary
5. Split-complementary
6. Application to flower arranging, etc.

UNIT VI FLORAL DESIGN

A. Principles of Design in Floral Arrangements
B. Choice of Container, Color Scheme, and Plant Textures
C. Suitability of Arrangement to Purpose
D. Seasonal and Holiday Arrangements

UNIT VII DRAWING

A. Freehand Perspective for Landscape Planning
B. Drawing of Flowers, Plants, Shrubs, Trees, etc.

UNIT VIII CRAFT WORK

A. Clay (ceramics)
B. Wood
C. Ribbon
D. Other Crafts, Applicable to the Field

UNIT IX HISTORIC ART STYLES

A. Styles of Art and Architecture
B. Naturalism, Formalism, and Functionalism

UNIT X DISPLAY

A. Counter and Window Display (Design and color schemes)
B. Three-dimensional Forms in Paper and Board for Display

BIBLIOGRAPHY OF TEXT AND REFERENCE BOOKS

Ornamental Horticulture

Related Drawing and Art

Grade 10

Alexander, Mary Jean. Handbook of Decorative Design and Ornament. Tudor Publishing Co., New York, 1965

Ballinger, Raymond. Layout and Graphic Design. Van Nostrand Reinhold Co., 1970

Dawson, Robert. Practical Carving. Watson-Guptill, New York 1972

Ellender, Raphael. Basic Drawing: New Ways to See and Draw. Doubleday and Co., Inc. 1964

Garrett, Lillian. Visual Design: A Problem-Solving Approach. Van Nostrand Reinhold Co., 1967

Green, Charles. Basic Drawing. Curriculum Laboratory, Rutgers University, 1970

Lindbeck, John R. Designing Today's Manufactured Products, 2nd ed. McKnight & McKnight Publishing Co., Bloomington, Ill. 1972

Speedball Textbook For Pen and Brush Lettering. Hunt Manufacturing Co., 19th Edition

MIDDLESEX COUNTY VOCATIONAL AND TECHNICAL HIGH SCHOOLS

ORNAMENTAL HORTICULTURE

Job Description

There are so many occupational titles in ornamental horticulture that job descriptions for all related titles cannot be given in this course of study outline. This course of study is developed to accommodate occupational needs in the field of ornamental horticulture as described in the New Jersey Manpower Needs in Natural Resources and/or Agriculture by Drawbaugh and Merritt of Rutgers University. This study conducted in 1972 describes future occupational opportunities in New Jersey, educational training levels deemed necessary, and wages which can be expected for specific jobs. It provides a basis by which a judgement for training a supply of graduates and entry level workers will correlate with the manpower needs of employers in New Jersey and thereby improve the efficiency of matching people with jobs. The study also indicated that ornamental horticulture occupations will increase between 1971 and 1976. Grounds Maintenance, Environmental Technologies, and In-Product Services and Sales will have the highest projected increase of all ornamental horticulture occupations.

D.O.T. Descriptions of Job Titles to be given emphasis in this course of study are:

407.884 Caretaker, Grounds Keeper, Gardener, Yard Laborer - Maintains grounds of industrial, commercial, or public property, performing a combination of the following tasks: cuts lawn, using hand mower or power mower. Trims and edges around walks, flower beds and walls, using clippers and edging tools. Prunes shrubs and trees to shape and improve growth, using shears. Sprays lawn, shrubs, and trees with fertilizer or insecticides. Rakes and burns leaves and cleans or sweeps up litter, using spiked stick or broom. Shovels snow from sidewalks and driveways. Plants grass, flowers, trees, and shrubs. Waters lawn and shrubs during dry periods, using hose or by activating fixed or portable sprinkler system. Repairs fences, gates, walls, and walks, using carpentry and masonry tools. Paints fences and outbuildings. Cleans out drainage ditches and culverts, using shovel and rake. Depending on the size and nature of employing establishment, may operate tractor equipped with attachments, such as mowers, lime or fertilizer spreaders, and lawn roller. May be known according to specific task performed as Grass Cutter, Hedge-and-Shrub Cutter, Lead Raker, Riding-Mower Operator.

406.168 Nurseryman, Nursery Farmer, Propagation Man - Manages nursery to grow trees, shrubs, and ornamental flowering plants: Determines kinds and amounts of plants to be grown, using

knowledge of plant germination, soil content, growing habits of plants, and market conditions. Selects and purchases seed, fertilizer, and gardening equipment. Hires and supervises nursery workers to plant seeds and cultivate plants. Supervises activities of workers engaged in marketing nursery products. Provides nursery services, such as landscape planting ornamental plants. May be designated according to specialization of nursery stock as Azalea Grower, Evergreen Grower, or when performing duties in greenhouse, may be designated as Greenhouse Florist.

44.384 Forester Aid - Works alone or as member of crew to inventory, protect, and reforest timber lands performing any combination of the following duties: Observes, measures, and records forest data, such as tree species, volume of merchantable timber, topographical features, and tree seedling mortality. Measures and maps such areas as burns, cutover areas, experimental plots, and timber sales sections, using staff compass and chain. Compiles data from recording or measuring instruments, such as rain gauge, thermometer, stream flow records, and soil moisture gauge. Participates in enforcement of recreation rules and regulations relating to parking, campfires, use of facilities and sanitation, to insure protection of picnic sites, camp grounds, and hunting and fishing areas. Answers questions on regulations, facilities, prevalence and types of wildlife and tree species. Performs seasonal tasks, such as planting trees (Tree Planter), spraying pesticides (Sprayer), pruning and thinning trees to improve timber stands (Tree Pruner), patrolling area to detect and report fires and hazardous conditions (Fire Patrolman), or leading crew to suppress forest fires (Suppression-Crew Leader).

406.181 Flower Grower - Grows shrubs, rootstocks, cut flowers or flowering bulbs: Plans acreages to be planted according to demand for species and variety and availability of seed, bulbs, or scion stock. Operates farm machinery to till soil, distribute fertilizers, and sow, cultivate and harvest crops (Equipment Operator). Buds or grafts scions on seedling stock. Directs work routine of seasonal and permanent farm hands and maintains records of wages and hours for workers. May develop new colors and varieties of flowers by cross-pollination. May be designated according to crop specialty as Bulb Grower, or Rose Grower.

260.458 Salesperson, Flower - Sells natural and artificial blowers, potted plants, floral pieces, and accessories, performing duties as described under Salesperson. Advises customer regarding types of flowers, floral arrangements, and decorations desirable for specific occasions, utilizing knowledge of social and religious customs. Arranges display of flowers and decorative accessories, such as vases and ceramics. Refers to local directories and newspapers to verify information, such as addresses

where flowers are to be delivered and time and place of funerals or other occasions. Contacts florists in other communities by telegraph or telephone to place orders for out-of-town delivery. May design and make up corsages, wreaths, sprays, and other floral decorations.

Course Description

Plants from the beginning have been fundamental to the existence of humanity. Man has varied in the respect and relationship given to plants and their function in the environment. An increase in the horticultural occupation indicates an increase in the importance of plants, and manpower studies indicate a need for trained people to work in the utilization of plant materials. This course of study seeks to give training for vocational applications to the use of plants.

Students seeking to make plants more functional in their lives do so out of a certain frame of reference. The teacher must be able to identify this frame of reference and motivate the student to set new educational objectives for developing even broader concepts as to the meaning of plants. To carry out these concepts, the following teaching objectives are to be considered:

1. The teacher will identify vocational and technical applications related to ornamental horticulture.

2. The teacher will relate vocational and technical applications to the student's frame of reference which include his home, school, and community.

3. The teacher must break down the skills and technologies into learning components and interpret the tasks involved in such a way that the student can comprehend in terms of learning objectives.

Academic Subjects

Since it is expected that entrants will be high school graduates or the equivalent, it is assumed that they will have a sufficient background of general education and mastery of fundamentals to enable them to concentrate on shop practice and related theory. If deficiencies do exist or needs become apparent, students will be scheduled to appropriate high school classes or special classes will be organized.

Related Subjects

The amount of time the student will spend on the study of the related subjects will vary somewhat depending upon the educational background and experience of the individual. Special schedules and classes are often set up as determined by an analysis of individual needs. In many cases, the shop instructor is able to teach whatever related subject matter is needed and in other cases students are

scheduled to high school classes. Regardless, the subject matter content is the same as shown in the course outlines for the high school courses in related math, related science and related drawing and art.

Length of Course

The course covers one full year of 180 school days, six clock hours per day. New pupils normally begin with the opening of school in September but entrants may be accepted at other time if openings are available.

Entrance Requirements

High school graduation or the equivalent is normally required. Applicants should have the personal qualifications, educational background and experience which make for success. Some background in horticulture is desirable but not necessary. A better than average ability in the field of science is preferred.

Adult Technical School Diploma or High School Diploma

Persons satisfactorily completing this one year course will receive a Middlesex County Adult Technical School Diploma.

If the person is not a high school graduate upon entering this program, he may earn a high school diploma provided he is in the shop program (ornamental horticulture) for a minimum of two years and meets all of the other requirements for this diploma. Transfer credits will be allowed for appropriate work satisfactorily completed in other high schools.

Where Offered

Burr D. Coe Vocational and Technical High School, of the
Middlesex County Vocational and Technical High Schools
112 Rues Lane
East Brunswick, N.J. 08816

Equipment and Facilities

The Ornamental Horticulture facility of the Middlesex County Vocational and Technical High School system, completed in the winter of 1973-74, contains the most recent innovations in shop facilities and equipment. The facilities have been constructed and equipped to equal those found in places of business outside of school. Along with this is a greenhouse and out-of-doors areas where students gain valuable hands-on experiences. The facility is flexible, attractive, and free of work hazards.

The facility consists of:

1. Planning room
2. Head house
3. Display and merchandising area
4. Greenhouse
5. Horticulture mechanics shop
6. Lath house
7. Area for vegetable garden plots
8. Area for nursery plantings
9. Aboretum and park train
10. Ornamental garden areas
11. Turf grass plots
12. Golf green and tee, grass tennis court, and athletic fields

Program of Studies

Grade 13

Subjects	Hours
Shop Practice	540 or more*
Related Biology, Physics, Chemistry	324 or less (1)
Related Mathematics	108 or less (1)
Related Drawing and Art	108 or less (1)
Total	1080

* If less time is needed in the related subject areas, the extra hours may be devoted to shop.

(1) If the adult student has successfully completed any of the related subjects in another school, he need not take them as part of his program.

COURSE OF STUDY OUTLINE

Ornamental Horticulture

Shop Practice

One Year Course for Adults

Objectives:

1. To study and compare plant varieties.
2. To plan garden production to satisfy aesthetic as well as practical needs.
3. To acquire knowledge concerning basic cultural practices in flower and vegetable gardening.
4. To learn basic landscaping methods.
5. To become familiar with merchandizing procedures used in the buying and selling of horticulture products.

UNIT I GARDENING VARIETIES AND THEIR PROPAGATION

A. Understanding Varieties and Qualities of Garden Plants
B. Choosing

   1. Seed
   2. Stock

C. Treatment and Germination
D. Flats

   1. Preparation of soil for germination

E. Seeding Garden Plants

UNIT II DEVELOPMENT OF THE GARDEN PLAN

A. Establishment of Plants

   1. Number
   2. Spacing
   3. The site

B. Grouping of Plants

   1. Size
   2. Color
   3. Beds
   4. Sun-loving and shade-loving
   5. Geometric designs

UNIT II DEVELOPMENT OF THE GARDEN PLAN (cont'd)

C. Equipment, Tools and Supplies

1. Type, kinds, quality
2. Storage and handling

UNIT III PREPARATION OF SOIL

A. Turning
B. Testing for Acidity and Alkalinity
C. Conditioning

1. Aerating, draining, nutrient holding

D. Fertilizers

1. Working into soil
2. Band and spot application

E. Discing and Leveling
F. Marking Sections and Rows

UNIT IV STARTING PLANTS

A. Strong Growth for Maximum Plant Quality

1. Importance of

B. Transplanting of Plants, Bulbs, Shrubs

1. Selection
2. Handling
3. Care

UNIT V PLANTING AND GROWING

A. Space and Depth Planting
B. Protection from

1. Heat
2. Cold
3. Pests

C. Soil Cultivation
D. Weed Control
E. Pinching, Suckering and Training
F. Annual Flower Beds
G. Perennial Flower Beds
H. Vegetable Gardens
I. Planters and Flower Boxes

UNIT VI PRODUCTION CONTROL

A. Control of Insects

1. Methods
2. Materials
3. Identification of insects

a. Destructive and helpful

B. Control of Diseases

1. Names and means of identification
2. Materials
3. Methods
4. Prevention of

C. Setting Blossoms
D. Supporting and Training Plants
E. Soil Fertility

1. Maintenance of

F. Water and moisture requirements

1. Irrigating
2. Mulching

UNIT VII MAINTENANCE OF THE GARDEN

A. Maintaining Plant Health
B. Plant Sensitivity
C. Harvesting

1. At maturity
2. In "optimum bloom stage"

UNIT VIII QUALITY IN FLOWERS AND VEGETABLES

A. Retaining Quality Of

1. Harvested fruits
2. Harvested vegetables

B. Grade Standards Of

1. Flowers
2. Vegetables

C. Exhibiting Fruits and Vegetables
D. Arranging and Exhibiting Flowers

UNIT IX LAWNS

A. Types of Grass

1. Names and uses of common types
2. Soil conditions
3. Moisture requirements
4. Fertilizers

B. Sod

1. Installation

C. Lawn Care

1. Mowing
2. Weeding
3. Watering
4. Liming
5. Seeding and re-seeding
6. Thatching
7. Aerating

D. Trouble Shooting

UNIT X SHRUBS

A. Types
B. Growth Characteristics
C. Selection
D. Placement and Arrangement
E. Care

1. Watering
2. Spraying

a. Importance of temperature, wind, etc.

3. Planting and transplanting

a. Size of hole, depth, fertilizer
b. Ball and burlap

4. Trimming or pruning

a. Proper times
b. Purpose

5. Fertilizing

UNIT XI TREES

A. Types
B. Characteristics
C. Maintenance

1. Planting and transplanting

a. Size of hole, depth, fertilizer
b. Ball and burlap

2. Pruning and training
3. Repairing damage
4. Watering
5. Spraying

a. Maintenance and operation of spray equipment
b. Mixing spray solutions

D. Selection

1. Importance of location of site

UNIT XII BASICS OF LANDSCAPE DESIGN

A. Interpretation of

1. Plot
2. Elevation plan

B. Site Evaluation
C. Work Procedures

UNIT XIII EXPLORING MERCHANDIZING AND SELLING

A. Activities

1. Designing and arranging
2. Using signs and display materials
3. Making sales approach
4. Writing orders
5. Delivering orders
6. Ordering materials and supplies
7. Keeping records
8. Wrapping and packaging
9. Advertising
10. Marking-up
11. Paying taxes and insurance
12. Making budgets

BIBLIOGRAPHY OF TEXT AND REFERENCE BOOKS

Ornamental Horticulture

Shop Practice

One Year Course for Adults

Automatic Watering. Chapin Watermatics, Inc., Watertown, N.Y. 1969

Business Leadership in the Agricultural Industry. Teacher Edn. Series 11 (1s), Dawson, J.I., Doran, H.F. and Curtis, S.M., Dept. Agr., Edn., Penna. State Univ., University Park, Pa. 1970

Federal and Domestic Plant Quarantine. Agric. Research Service, U.S. Dept. of Agriculture, Washington, D.C. 1970

Gardening in Containers. Sunset Series Lane Book Co., Menlo Park, Ca. 1967

Garner, R.J., The Grafter's Handbook. Third Edition, Oxford Univ. Press, Fair Lawn, N.J. 1958

Hartman, H.T. and Kester, D.E., Plant Propagation Principles and Practices. Second Edition, Prentice-Hall, Inc., Englewood Cliff, N.J. 1968

Insects Identification Manual. Calif. State Polytechnic College, San Luis Obispo, Ca. 1966

Krentzman, H.C., Managing for Profits, Small Business Administration, Washington, D.C. 1966

Laurie, A., Kiplinger, D.C., and Nelson, K.S. Commercial Flower Forcing. McGraw-Hill Book Co., N.Y. 1968

Marketing of Ornamental Nursery Stock. Amer. Assn. of Nurserymen, Inc., Washington, D.C. 1965

"Mechanization." Section IV, Nursery Management Handbook, Furuta, T., Agr. Ext., Univ. of Calif., Riverside, Ca. 1969

Patterson, J.M. Container Growing. American Nurseryman, Chicago, Ill. 1969

Pinney, John J., Beginning in the Nursery Business. American Nurseryman Pub. Co., Chicago, Ill. 1967

Pinney, John J., Operating a Garden Center. American Nurseryman Pub. Co., Chicago, Ill. 1963

Pinney, John J., The Nursery Business. Small Business Administration, Washington, D.C. Feb. 1971

Pirone, P.P., Dodge, B.O., Ricket, B.D., and Rickett H.W., Diseases and Pests of Ornamental Plants. Ronald Press, New York, N.Y. 1970

Plant Hardiness Zone Map. Misc. Publ. No. 814, Agri. Research Service, U.S. Dept. of Agri., Washington, D.C.

Producing Better Transplants. Tech. Bul. No. 120, Jiffy Products of America, West Chicago, Ill. 1970

1971 Recommended Insecticides and Miticides. Penn. State Univ., College of Agr. Ext. Serv., University Park, Pa.

Safety in Applying Pesticides Commercially. Special Circular 138, Penn. State Univ., College of Agr. Ext. Serv. University Park, Pa.

Tractor Operation and Daily Care. Cat. No. 103, Amer. Assoc. for Voc. Instr. Materials, Engineering Center, Athens, Ga. Rev. 1970

U.S.A. Standard for Nursery Stock. Amer. Assoc. of Nurserymen, Inc., Washington, D.C. 1969

COURSE OF STUDY OUTLINE

Ornamental Horticulture

Suggested Teaching Aids

Catalogs

Ball '75
Box 10175
Palo Alto, California 94303

Fleck's Supplies
1139 Street Road
Southampton, Pa. 18966

Gloeckner Co., Inc.
15 E. 26th Street
New York, New York 10010

E. H. Griffith, Inc.
2250 Palmer St.
Pittsburgh, Pa. 15218

Krigger and Co., Inc.
3025 Babcock Blvd.
Pittsburgh, Pa. 19237

Field Trips

Rutgers University
College of Agriculture and Environmental Science
New Brunswick, N.J.

New York Botanical Gardens
New York, N.Y.

Tour of Middlesex County Parks
1. Roosevelt Park, Metuchen, N.J.
2. Johnson Park, Highland Park, N.J.

Tour or visit to ornamental horticulture places of business within short distances from the school.

Filmstrips

Encyclopedia Britannica Films, Inc.
1150 Wilmette Ave., Wilmette, Ill.
"Great Names In Biology Series"
Leevenhock, Linnaeus, Darwin,
Mendel, Pasteur, Harvey

Filmstrips (cont'd)

"Plant Life Series"
Flower and fruits, Leaves of Plants,
Life Cycle of a Plant, The Plant Kingdom,
Roots of Plants, Stems of Plants

Periodicals

American Nurseryman Magazine
American Nurseryman Publishing Co.
Chicago, Illinois

Florist's Review
Florists' Publishing Co.
343 So. Dearborn St.
Chicago, Ill.

Flower News - The Florist's National Weekly Newspaper
Central Flower News, Inc.
549 Randolph St.
Chicago, Ill.

Horticulture Magazine
Massachusetts Horticulture Society
Boston, Mass.

Park Maintenance Magazine
Madison Publishing Co.
Appleton, Wisc.

Slides

Guidance Associates - Harcourt Brace Co.
Biology 500
Cartridge B - Biochemistry, Microorganisms (79 slides)
Cartridge C - Morphology and Physiology of Plants, Flowering Plants (74 slides)

COURSE OF STUDY OUTLINE

Ornamental Horticulture

Shop Vocabulary

abnormal
absorption
accelerate
accident
account
acetylene
address
adjustment
advertise
aeration
aerophyte
ageratum
agronomy
aluminum
amperage
analysis
animal
annual
apple
arboretum
area
arrange
arrangement
artificial
association
aster
athletic
azalea
balling
barometer
battery
beetle
begonia
bench
biennial
blade
bluegrass
bonsai
border
botanical
boxwood
bracing
branch
brass
brick
broadcast
broccoli
budding
bulb
burlap
business
cactus
calibrate
candle
capillary
capital
carbon dioxide
carburetor
career
carnation
catalog
cavity
cedar
ceramic
characteristic
chart
chemical
cherry
chipping

chrysanthemum
circuit
classification
cleanliness
clothing
coleus
color
commodity
community
common -
company
compost
concrete
condenser
condiment
condition
conservation
conservatory
conserve
construct
consume
consumer
consumption
contaminant
contaminate
control
copper
corsage
cosmos
crop
crownvetch
cucumber
cultivar
cultivate
culture
cutting
dahlia
damage
damping
dangerous
deciduous
delivery
depth
design
detergent
dicotyledon
direction
disbudding
discount
disease
display
dogwood
dracena
drainage
drench
driftwood
dry wall
duster
earthworm
ecology
economics
edging
electricity
elm
emergency
engine
environment
epiphyte
equipment
erosion
evaluate
evaluation
evergreen
expense
factor

faucet
fence
fern
fertilizer
fescue
fiber
fiberous
finger
fireplace
plagstone
flammable
flat
floral
florist
flower
fluid
foil
foliage
forbidden
foreman
forest
forsythia
foundation
foxglove
frame
freeze
fresh
frost
fruit
fumigate
furniture
galvanized
garden
gasket
genetics
geranium
germinate
germination
gladiolus
glass
glazing
gloxenia
goggles
gourd
grafting
grass
grease
green
greenhouse
ground
groundskeeper
grouping
guard
hardwood
hardy
harvest
hazard
heading
hemlock
herb
herbaceous
holiday
hollyhock
horseplay
horticulture
hose
hotbed
humidity
hydrangea
identification
identify
imbalance
impatiens
indoor
injury
inorganic
insect
install

insurance
inventory
invoice
irrigate
iris
label
laboratory
landscape
larkspur
lathhouse
lattice
lawn
layering
leaf
leaflet
leaves
lettuce
level
light
lilac
lily
letter
lubricant
machine
machinery
macromay
magazine
mall
manager
manipulate
manure
maple
marigold
market
markup
masonry
materials
mechanic
merchandising
metabolism
microbes
microclimate
mimosa
misting
mixing
moisture
mold
monocatyledon
mortar
motor
mower
mulch
myrtle
native
needle
nematodes
nitrogen
nozzle
nursery
nutrient
nutrition
operator
orchard
orchid
order
organic
ornamental
outdoor
oxygen
package
packing
paint
park
parsley
particles

partition
party
patio
peach
pear
peatmoss
penetration
peatmoss
penetration
peony
percent
percolate
perennial
persist
pest
pesticide
petal
petunia
philodendron
phlox
phosphorous
pinching
pistil
piston
plant
planter
plastic
plot
plumbing
pneumatic
poinsettia
poison
poisonous
pollen
pollinate
pollination
pollutant
pollute
pollution
poplar
portable
potassium
potting
power
prevention
price
problem
produce
production
propagation
protection
pruning
pulley
pyrocanthus
quality
quantity
receipt
recreation
refrigerate
refrigeration
refrigerator
register
regulate
regulation
reinforce
relative
renovate
replant
research
respirator
response
retail
retard
rhizome
rhododendron
ribbon
rodent
root
rose
ryegrass
safety

salad
salvia
sample
sanitation
screen
seed
seedling
serious
shade
shading
shaft
shears
shelf
shelves
shock
shred
sign
slope
snapdragon
sod
softwood
soil
solenoid
species
specimen
spice
spiria
spore
spray
sprayer
stake
stamen
starter
statice
steam
stem
sterile
sterilze
stone
storage
stratification
street
strictly
structure
surface
survey
sycamore
symptoms
technique
telegraph
telephone
temperature
test
texture
thatcher
thermometer
thermostat
thinning
tint
tissues
tolerance
tomato
tool
topiary
topography
toxin
trail
transplant
trash
tray
trellis
trunk
tulip
turf
ultra-violet

undercover

valve

variety

varment

vascular

vase

vegetable

ventilate

ventilation

verbena

viable

vinca

vine

violet

voltage

walkway

walnut

water

weather

wedding

weed

weight

wholesale

wilt

windbreak

zinnia

MIDDLESEX COUNTY VOCATIONAL AND TECHNICAL HIGH SCHOOLS

___New Brunswick ___ Perth Amboy ___Woodbridge ___East Brunswick

FINAL EXAMINATION

RELATED THEORY - GRADE 10

ORNAMENTAL HORTICULTURE

NAME _____ DATE _____

	SECTION OR PART	POSSIBLE SCORE	SCORE
PART I	True - False	50	_____
PART II	Matching 1	25	_____
PART III	Matching 2 (Sections A,B,C)	50	_____
PART IV	Multiple Choice (Sections A,B)	40	_____
PART V	Identification	25	_____
		190	_____ = _____ %

Grade = _____ %

SCORED BY: _____

MIDDLESEX COUNTY VOCATIONAL AND TECHNICAL HIGH SCHOOLS

___New Brunswick ___Perth Amboy ___Woodbridge ___East Brunswick

FINAL EXAMINATION

Ornamental Horticulture
Related Shop Theory - 10th Grade

Name_____Date_____Score_____

PART I
True-False
(Value: 1 Point Each - Total = 50 Points)

DIRECTIONS: Examine each statement below and decide whether it is true or false. If true, put a T on the line at the left of the statement. If false, put an F on the line at the left of the statement.

SAMPLE PROBLEM:

__T__ A. The fir tree is an evergreen.

____ 1. The formal garden is a product of the oriental culture.

____ 2. Theophrastus is the Father of Botany.

____ 3. George Mendal studied the plant cell and its physiology.

____ 4. Herbs are woody stem plants.

____ 5. Perennials complete their life cycle in the second year of growth.

____ 6. The sweet potato is an underground stem.

____ 7. Evergreens never shed their leaves.

____ 8. Cabbage and Broccoli are considered cole crops.

____ 9. Cherries and peaches are considered pome fruits.

____10. Grasses are dicotyledons.

____11. Plants are classified by Kingdom, Phylum, Class, Order, Family, Genus and Species.

____12. Plants are classified according to their structure.

____13. Pectin is found in the cell wall.

____14. The nucleus is the living substance in the cell.

____15. The cell is the basic unit of reproduction.

(continued)

____16. The meristem is composed of cells actively involved in cell division.

____17. The phloem carries nutrient from the roots to the leaves.

____18. The epidermis protects the plant from excess transpiration.

____19. A strawberry has a crown located at the top of the plant.

____20. Flowers show a great variety in structure.

____21. The stomata generally opens in the night and closes during the day.

____22. The strawberry plant has a berry fruit.

____23. Seed germination requires increased respiration.

____24. Respiration is the synthesis of sugar by a plant.

____25. Osmosis involves the principle of diffusion.

____26. Auxins are hormone like growth promoting substances.

____27. Roots grow downward as a result of phototropism.

____28. Topsoil does not always contain organic matter.

____29. Perculated water forms the water table.

____30. A silty clay soil will hold water more readily than a sandy clay soil.

____31. Slope is expressed in feet rise per 1000 ft.

____32. Nitrogen tends to be the most limiting element to plant growth.

____33. Sulfur becomes highly available at a low ph.

____34. Blueberries and Rhododendron like an alkaline soil.

____35. Ph. is a measure of the hydrogen ion concentration.

____36. A frost and a freeze have the same effect on plants.

____37. Short day plants flower best in the fall of the year.

____38. Juvenile plant growth is influenced by the age of the growth.

(continued)

____39. In partial senescense the entire plant dies except the seed.

____40. The producer gets the greatest share of the food dollar.

____41. Curing is a process of which produce is prepared for storage.

____42. Precooling is the rapid removal of heat from shipped produce.

____43. Decaying fruits produce gas and heat.

____44. In storage heat, humidity and volatiles should be controlled.

____45. Transportation costs are not influenced by the production ability of the land.

____46. Climate has had a great influence upon our production system.

____47. Lake regions have the advantage of moderated temperatures.

____48. Europe leads the world in the production of potatoes.

____49. North America leads in the production of citrus, peaches, and grapes.

____50. There is a great deal of relationship between price and quality of ornamental plant material on the market.

1974-75

PART II
MATCHING 1
(Value: 1 Point Each - Total = 25 Points)

DIRECTIONS: In the columns velow, match the term in Column B to its meaning in Column A. Place the letter of the term from Column B on the line before its corresponding meaning in Column A.

SAMPLE:

COLUMN A	COLUMN B
a A. Most roses are	a. red b. green c. brown

COLUMN A	COLUMN B
____ 1. Exhibits juvenility growth habits in its leaves.	A. Grapevines
____ 2. Has runners.	B. Mimosa
____ 3. Tree with parallel veined leaves.	C. Raspberries
____ 4. Its leaves are highly sensitive to touch.	D. Strawberries
____ 5. Exhibits a great deal of hybrid vigor.	E. Avocado
____ 6. The universal flowering plant used in landscaping.	F. Forsythia
____ 7. Has tendrals.	G. Mulberry
____ 8. Can be reproduced from bulbils and bulblets.	H. Wheat or rye
____ 9. A member of the composite family.	I. Big-Boy tomato
____10. Is considered a bramble crop.	J. Ginka
____11. Produces tubers.	K. Cabbage
____12. Considered a rhinoid plant.	L. Tulip tree
____13. Exhibits alternation of generation.	M. Rhododendron
____14. A good ground cover plant.	N. Blueberries
____15. A popular early flowering shrub with a yellow bloom.	O. Royal Palm
____16. Exhibits etiolation.	P. Potato
____17. Its seed will respire at low temperatures.	Q. Lilies
____18. A drupe fruit.	R. Morning glory
____19. A pome fruit.	S. Red clover
____20. The bumble bee is the major pollinator.	T. White Spruce
____21. Has phototrophic flowering habits.	U. Cherry
____22. Leondendron Tulipifera.	V. Iris
____23. Picea canadensis.	W. Apple
____24. A broadleaf evergreen.	X. Fern
____25. A fruiting plant requiring sharply acid soil.	Y. English ivy
	Z. Rose
	AA. Lettuce
	BB. Dockweed

PART III
MATCHING 2 - SECTION A
(Value: 1 Point Each - Total = 20 Points)

DIRECTIONS: In front of each statement or word in Column A place one of the terms shown in Column B. Some Column B terms will be used more than once.

SAMPLE:

	COLUMN A	COLUMN B
b	A. Geranium	a. mineral
b	B. African Violet	b. plant
		c. animal

COLUMN A	COLUMN B
___ 1. Aphids	a. chewing insects
___ 2. Malathion spray	
___ 3. Corn smut	b. sucking insects
___ 4. Hollow heart of potatoes	
___ 5. Japanese beetle	c. bacteria or fungus
___ 6. Chloresis of the leaves	
___ 7. Methoxchlor spray	d. physiological
___ 8. Damping off	
___ 9. Zineb spray	e. weeds
___10. Bolting	
___11. Add minor elements	
___12. Mercuric chloride	
___13. Grasshoppers	
___14. Planton	
___15. 2, 4D	
___16. Scales	
___17. Tissue Breakdown	
___18. Pre-emergance spray	
___19. Apple rust	
___20. Arasan	

PART III
MATCHING 2 - SECTION B

COLUMN A	COLUMN B
____ 1. Oneness	a. unity
____ 2. Suitable relationship in size	b. scale
____ 3. Blending to make completeness	c. accent
____ 4. Equilibrium	d. balance
____ 5. Pot fits the bouquet	e. harmony
____ 6. Focal point	f. rhythm
____ 7. Subtle likeness	
____ 8. A sense of motion	
____ 9. Stabilizing visual weights	
____10. The bull's eye effect	
____11. Asymmetrical	
____12. Symmetrical	
____13. Absence of any jarring effect	
____14. Frozen motion	
____15. Togetherness	

MATCHING 2 - SECTION C

COLUMN A	COLUMN B
____ 1. Overall shape	a. form
____ 2. Absence of form	b. line
____ 3. Element that leads the eye	c. texture
____ 4. Manner of structure	d. color
____ 5. Spherical	e. open space
____ 6. Surface quality	
____ 7. Uninterrupted sequence	
____ 8. Smooth, rough, shining, or dull	
____ 9. Voids	
____10. The fourth dimension	
____11. Shades, tints, and tones	
____12. A curving stem	
____13. Results of light rays	
____14. Triangular	
____15. Empty areas	

PART IV
SECTION A
(Value: 1 Point Each - Total 25 Points)

DIRECTIONS: Each of the following statements can be correctly completed by one or more of the lettered expressions. You are to circle the letter or letters which is/are the correct answer/s.

SAMPLE:

A. A petunia is
(a) A flower
b A mineral
(c) A annual
d A gas

1. Vegetative growth of plants is to a large degree controlled by light. An abundance of light causes plants to have
a. shorter stems.
b. thin stems.
c. dark green leaves.
d. large leaves.
e. fibrous root systems.

2. The prefix "photo", which means light, is used in many words. Which of the following definitions are correctly matched to the term?
a. Photophobia - Plants which love high light intensities.
b. Photoperiodism - The response of plants to the relative length of day and night.
c. Phototrophism -The bending of plants toward light.
d. Photosynthesis - Use of light by plants to make carbohydrates.
e. Photochrome - The silver sheen which can be rubbed off cabbage leaves.

3. Fewer days are required to produce flowers on plants during
a. spring months than summer months.
b. spring months than winter months.
c. cold weather than hot weather.
d. bright weather than cloudy weather.
e. wet weather than dry weather.

4. Daylength affects plant growth and reproduction. We know that
a. all plants flower when days are long and nights are short.
b. dormancy of woody plants in the autumn is brought about by short days.
c. daylength controls tuber and bulb formation.
d. daylength controls size of flower.
e. flowering of chrysanthemums is governed by daylengths.

5. Chrysanthemums are pinched to encourage more terminal shoots. More shoots will grow from a pinch if done
   a. during summer months.
   b. early in the morning.
   c. during bright weather.
   d. in a shaded greenhouse.
   e. on soft vegetative growth.

6. There is a tendency to crowd extra plants into the greenhouse. Crowding and excessive shading of chrysanthemums produces
   a. high quality flowers.
   b. dark green plants.
   c. short, branching plants.
   d. carbohydrate-deficient plants.
   e. leggy, weak-stemmed plants.

7. If daffodils are forced in the greenhouse in January rather than March, it can be expected that
   a. more days will be required to flower them.
   b. plants will be larger and healthier.
   c. more flowers will be produced from each bulb planted.
   d. the crop can be grown with less risk.
   e. flowers will be larger and of a better color.

8. The initiation of flower buds on chrysanthemums is dependent upon the factors of environment. The critical factors are
   a. ventilation.
   b. temperature.
   c. nutrients.
   d. humidity.
   e. daylength.

9. Much experience is required to correctly water plants. Overwatered greenhouse plants are
   a. tall, soft, and leggy.
   b. extremely susceptible to disease injury.
   c. short,hard, and stocky.
   d. readily injured by sun, cold, and handling.
   e. easy to work with since they bend rather than break.

10. Daffodils respond to limited soil moisture by producing
   a. larger flowers.
   b. smaller flowers.
   c. brighter colored flowers.
   d. more flowers.
   e. crippled flowers.

11. Seeds germinate more rapidly if sown in a seed bed that is
   a. sterilized.
   b. moist.
   c. fertilized.
   d. loose and fine.
   e. firm and fine.

12. Plants wither immediately after transplanting them. Sound reasoning tells us this happens because
    a. they are not accustomed to the new soil.
    b. transpiration loss is greater than root intake of water.
    c. a steady breeze is not blowing over the plants.
    d. relative humidity is low.
    e. the sun is too hot.

13. Temperature affects the rate of growth and shape of plants. High temperatures cause plants to
    a. be short and stocky.
    b. be long and spindly.
    c. grow more rapidly.
    d. mature more evenly.
    e. limit root size.

14. Temperature is an environmental factor of plant growth which affects
    a. photosynthesis.
    b. flowering.
    c. transpiration.
    d. leaf shape.
    e. phototrophism.

15. A rooting medium which is kept 5 to 10 degrees warmer than air temperatures
    a. promotes healing of the wounds of cuttings.
    b. encourages early root development on cuttings.
    c. tends to dry out and wilt the plant.
    d. replaces root hormones.
    e. is necessary to start all kinds of cuttings.

16. Cuttings can be held for short periods of time in a refrigerator before planting because
    a. the need for moisture is eliminated.
    b. disease cannot exist in the cold environment.
    c. stored food in the plant is exhausted more slowly under cold conditions.
    d. all physiological functions of plants are slowed up by cooler temperatures.
    e. temperature is not a function of plant growth.

17. A pre-cooling treatment is required for early forcing of some bulb crops. During this period of dark, cool conditions, daffodil bulbs
    a. start flower buds.
    b. remain dormant.
    c. initiate roots.
    d. send up top growth
    e. build up a food reserve.

18. Daffodils are forced at a 60 degree F. temperature. If grown in warmer greenhouses, they produce
    a. flowers of poorer quality.
    b. shorter stalks and stems.
    c. more flowers per bulb.
    d. flowers with brighter colors.
    e. flowers in fewer days.

19. Cabbage seeds are generally germinated and grown before tomato seeds because
    a. both kinds of crops cannot be grown with the same greenhouse humidity.
    b. cabbage plants are hardier than tomatoes and can be set out earlier.
    c. tomato plants require warmer growing temperatures than cabbage plants.
    d. tomato plants require more light than cabbage plants to grow.
    e. tomato plants require a better ventilated greenhouse than cabbage plants.

20. When rooted cuttings are planted deeply into the soil
    a. suffocation may result.
    b. plant food can be gotten easier.
    c. soil moisture is a problem.
    d. they grow more evenly.
    e. disease is more apt to attack.

21. Healthy plants have healthy root systems. Healthy chrysanthemum roots are
    a. light in color.
    b. dark in color.
    c. fibrous or branching.
    d. with few root hairs.
    e. distributed throughout the pot.

22. Chrysanthemums are grown more successfully in a soil mixture which provides for
    a. water holding capacity.
    b. aeration.
    c. water drainage.
    d. high salt content.
    e. living organisms.

23. Size of daffodil bulbs purchased is a factor of production because food is stored in the bulb. Purchase large bulbs rather than small ones because they produce
    a. larger flowers.
    b. more flowers.
    c. earlier flowers.
    d. more perfect flowers.
    e. the same amount and kind of flowers.

(continued)

24. To produce a flower crop, bulbs need
    a. much fertilizer.
    b. much nitrogen.
    c. a high-organic soil.
    d. little plant food.
    e. no side-dressing of fertilizer.

25. Size of seed is directly related to
    a. speed of germination.
    b. size of mature plants.
    c. depth of planting.
    d. establishment of the crop.
    e. age the plants will attain.

PART IV - SECTION B
(Value: 1 Point Each - Total = 15 points)

DIRECTIONS: Each of the following statements can be correctly completed by one or more of the lettered expressions. You are to circle the letter or letters which is/are the correct answer/s.

Dean and Dale, twin boys in 9th grade vocational agriculture, each had a garden project with 10,000 square feet of growing space as a part of their farming programs.

1. Dean's garden was on a Southeastern slope. What were the advantages of Dean's sloping garden over Dale's level one?
   a. It will produce vegetables of higher quality than will the level one.
   b. Because of better water drainage, crops can be planted earlier in the spring.
   c. Topsoil is generally more fertile on a slope than on level land.
   d. Plants grown on a slope are more drought-resistant than those grown on level land.
   e. Soils on a slope to the southeast will warm up more quickly in spring than will level land.

2. Which statements made by the boys while studying and observing the growing plants are correct?
   a. Hot weather does not cause lettuce to go into the reproductive stage.
   b. Length of growing season listed on the seed package for each vegetable is correct regardless of the kind of growing season.

2. (cont'd)
   c. Celery plants are green until light is kept away from them for the purpose of blanching the crop.
   d. Peas grow as well during cool autumn days as they do during the spring when days are cool.
   e. Long carrot varieties should be planted in poor soils to grow deeper and reach more plant nutrients.

3. Both boys regularly cultivated the crusted garden soil. Other than for killing weeds, cultivating is done to
   a. prune lateral roots which promotes deep rooting of the growing plants.
   b. provide easier movement for earthworms and other living organisms.
   c. exchange soil near the plant for fresh soil.
   d. provide for air movement in the soil needed by roots.
   e. improve the appearance of the project.

4. Dean sowed ryegrass in his sloping garden for the winter season. His objectives were to
   a. make spring cultivation easier.
   b. increase the amount of water run-off.
   c. provide green manure for the next crop.
   d. provide a mulch for the crop presently growing.
   e. reduce soil erosion by holding the topsoil.

5. The boys studied storage conditions for part of the harvested vegetable crop. A satisfactory vegetable storage requires that
   a. air circulation or ventilation be provided.
   b. artificial light be supplied the stored vegetables.
   c. the storage facilities be moisture-proof.
   d. the temperature remain constant.
   e. the floor be constructed of concrete.

6. When storing potatoes, the boys saw defects on some of them and guessed reasons for the conditions. Which reasons are correct?
   a. Green color on the skin of a potato is caused by exposure to sunlight.
   b. Second growth is caused by drought followed by a rainy season.
   c. Scab is caused by too much nitrogen fertilizer per acre.
   d. Late blight and dry rot are the results of cool, dry weather.
   e. Small potatoes are the result of a short growing season.

A FORESTRY SPEECH (Questions 7-11)

Jim Knot was planning an FFA speech on farm forestry. He realized the best way to start was to gather information and study the subject thoroughly before beginning to write.

7. He noticed first that trees grown in the forest or woodlot differed from those grown in the open. Which of these observations can Jim truthfully use in his speech notes?
   a. Trees grown in close competition with other trees have long, straight stems or trunks.
   b. Trees grown in the open have smaller crowns than those grown in competition.
   c. Lack of sufficient light causes lower limbs of trees grown in competition to die.
   d. Trees grown in the open provide better wood products than those grown in competition.
   e. All trees in a natural stand have equal opportunity to develop to their full capacities.

8. Jim studied annual rings on the end of logs and on nearby stumps when he visited a sawmill. At the end of the visit he could correctly write that annual rings are
   a. a living part of the tree and continue to grow each year.
   b. the result of varying rates of growth caused by seasons of the year.
   c. not associated with the strength and weight of the lumber.
   d. wide when trees grow rapidly as a result of fertile soil.
   e. not as useful as height in measuring growth of a lumber tree.

9. Jim was appointed chairman of the tree planting committee because of his knowledge of forestry. A classmate planned to plant 3,000 seedlings. Approved practices in forestry Jim can give his classmate are:

   a. Order several species of trees to be sure that one will be adapted to the planting site.
   b. Use five-year old seedlings which are easier to establish than are two-year olds.
   c. Cut bundles, "heel-in", and water thoroughly all tree seedlings upon arrival if planting is not done immediately.
   d. Plant trees during early spring so they can take advantage of abundant rains and become established quickly.
   e. Prepare holes or furrows to plant the tree seedlings one day and plant them on the following day.

10. Many varied factors influence constantly the way trees grow. After studying trees in many locations, Jim could correctly say in the speech that
   a. locust, for example,will grow on very poor soils while black walnut demands fertile soils.
   b. evergreen trees of all kinds die when subjected to smoke and gas from nearby industrial centers and railroads.
   c. soil moisture is not a determining factor as to the kind of natural stand established on a site.
   d. all trees are legumes with fibrous root systems and can be established easily anywhere.
   e. trees which flourish in the warmer latitudes seldom can withstand the more severe temperatures in the north.

(continued)

11. A management plan is desirable if a specified woodlot property is to be properly handled. Which should not be included in the plan?
    a. Weed trees should be removed from the woodlot if time permits.
    b. Use selection cutting methods when harvesting the farm woodlot.
    c. Remove trees from the edge of the woodlot when they are mature.
    d. Scatter tops and limbs of harvested trees evenly over the woodlot.
    e. Allow cattle to graze in the woodlot to tramp the soil tightly around the tree roots.

ORCHARDING, A NEW LEARNING ACTIVITY (Questions 12-15)

A 10-acre orchard with both apple and peach trees was given to the FFA Chapter for an educational and profit-making activity. Considerable learning was necessary if much profit was to be realized from the project.

12. The group soon discovered that the orchard was ideally located. Can you select the desirable requirements for the orchard site?
    a. Located on the slope of a hill with air drainage in two directions.
    b. Far inland and away from a large body of water.
    c. At the lower end of a valley.
    d. In a relatively mild temperature zone with violent changes in winter temperatures.
    e. With relatively deep, well-drained loam soil.

13. Trees in the orchard have not been pruned for two years. Textbooks on orchard management make which statements about pruning?
    a. Prune both apple and peach trees to the same size and shape.
    b. Prune peach trees to provide open centers.
    c. Pruning a tree is more a matter of opinion than a practice governed by a set of rules.
    d. Remove few branches from a young tree if greater and more rapid growth is desired.
    e. Cut off the larger growing and more leafy branches which receive the most sunlight.

14. There are occasions when excess immature fruit must be removed from fruit trees. Sound bases for thinning fruit are:
    a. Thinning promotes and insures the annual bearing of fruit.
    b. When fruit is thinned properly, grading is not necessary.
    c. Thinning is more necessary on light, sandy soils deficient in moisture than on heavier loam soils.
    d. The size of fruit is largely determined by the leaf surface adjacent to the individual fruit.
    e. A labor-saving method for thinning fruit is to limit the number of sprays which encourages a larger drop of fruit.

15. After studying deficiency symptoms, the class decided to fertilize nine young apple trees. Symptoms which point to fertilizer deficiencies are
    a. small, sparse, yellowish leaves.
    b. a small fruit set on the trees.
    c. non-bearing spurs with at least 1/2 inch of growth.
    d. stocky stems or trunks.
    e. chewed leaves and rough, scaly bark.

PART V
IDENTIFICATION
(Value: 1 Point Each - Total=25 Points)

DIRECTIONS: Refer to the sketch shown and locate the letter of each numbered item shown in Column A. Place the letter of the correct answer on the line before the corresponding numbered item.

SAMPLE:

COLUMN A

B A. Tree
C B. Lawn
A C. House

on facing page)

___ 1. The key landscape focal point
___ 2. Foundation deciduous shrubs
___ 3. Evergreen foundation shrubs
___ 4. Rose beds
___ 5. Interest focal points
___ 6. Ground covers
___ 7. Evergreen shrub border tree
___ 8. Flowering deciduous border
___ 9. Broadleaf evergreens
___ 10. Public area
___ 11. Private area
___ 12. Utility area
___ 13. Flower border
___ 14. Framing trees
___ 15. Planter boxes
___ 16. Design scale
___ 17. Devil strip
___ 18. Northeastern exposure
___ 19. Fences
___ 20. Hedges
___ 21. Breezeway
___ 22. Patio
___ 23. Kentucky blue grass
___ 24. Walkways
___ 25. Designer

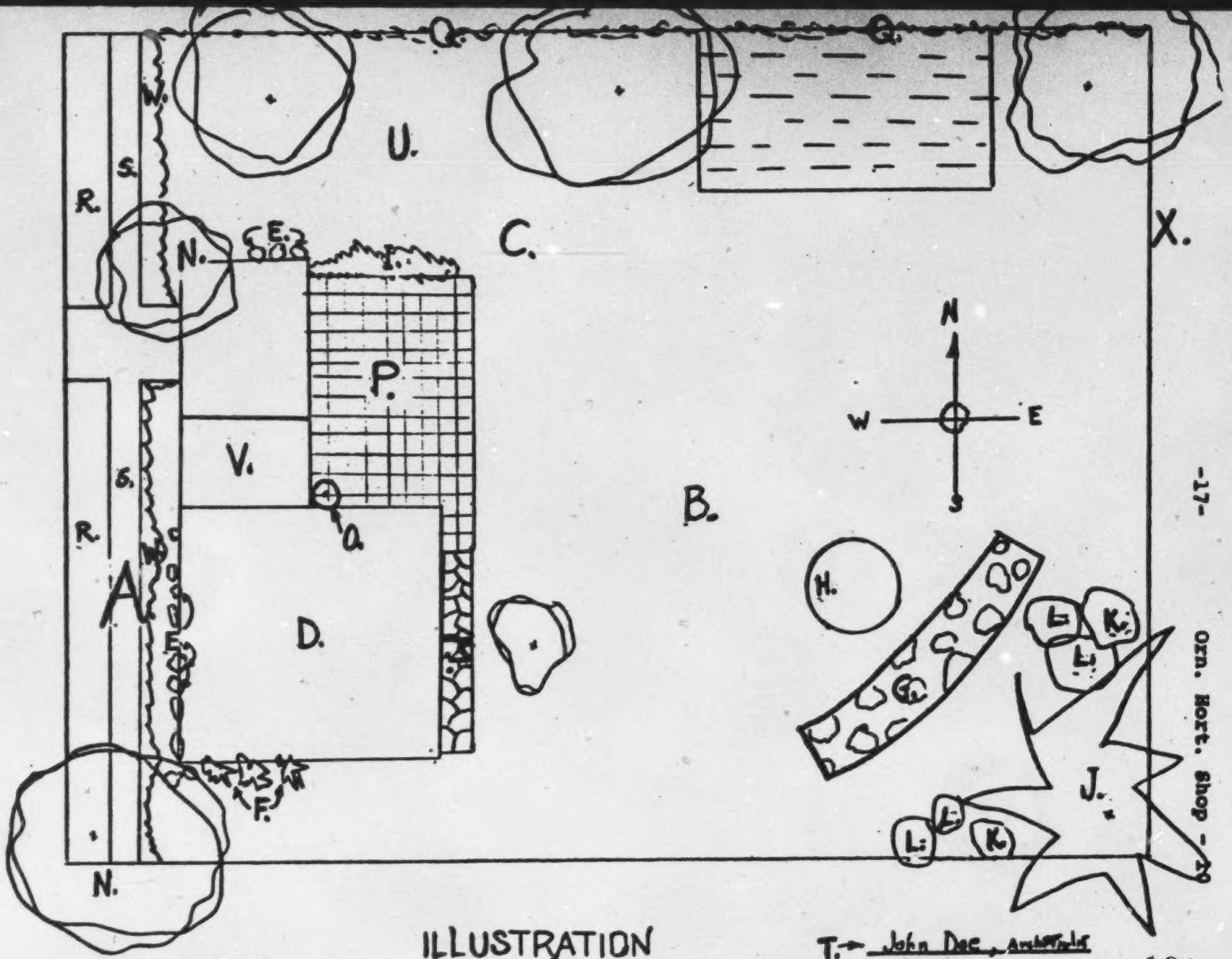

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ILLUSTRATION

T. → John Doe, Architect
Y. → 1" = 1½ FT

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